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1958-1959

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GEORGE C. HOUSER, 220 Clyde Street, Brookline 67, Massachusetts.

THE Association was organized in Boston, Mass., on June 21, 1882, with the object of providing its members with means of social intercourse and for the exchange of knowledge pertaining to the construction and management of water works. From an original membership of only TWENTY-SEVEN, its growth has prospered until now it includes the names of over 1000 men. Its membership is divided into six classes, viz.:

A Member shall be an officer or employee of a public or private water works, an engineer, chemist or other person qualified to aid or interested in the advancement of knowledge relative to water works.

An Honorary Member shall be a person of acknowledged eminence in some branch of water supply or of engineering.

A Junior shall be not less than eighteen years nor more than twenty-five years of age, a student or connected with water supply work.

An Associate shall be either a person, firm or corporation engaged in manufacturing or furnishing materials or supplies for the construction or maintenance of water works.

A Corporate Member shall be either a Water Board, Commission, Company or Municipal Corporation.

The initiation fees and annual dues are as follows:

	Initiation Fees	*Annual Dues*
Members	$ 5.00	$ 5.00
Juniors	1.00	1.00
Associates	10.00	25.00
Corporate Members	10.00	15.00

This Association has at least eight regular meetings each year, of which five are held in Boston, one in northern New England, one in southern New England, and one, the annual convention, held in September or October on such date as the Executive Committee may designate.

Tapping that involves no "bugs" may mean frustration to the woodpecker, but it spells economy and efficiency to the water works operator. This type of tapping comes naturally with Lock Joint Concrete Pressure Pipe.

Modern tapping equipment and technique have made the tapping of Lock Joint Concrete Pressure Pipe a simple, speedy operation. Small outlets for service connections, or larger ones for take-offs or cross connections, may be made under pressure with no danger of cross-threading or splitting the pipe.

Thousands of such pressure taps made in the field on Lock Joint Concrete Pressure Pipe attest to the reliability of an operation which, in no case, ever caused damage to the pipe being tapped.

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1. **HIGH FLOW CAPACITY . . .** Cement lined cast iron pipe and fittings will not tuberculate . . . delivers a full flow for the life of the pipe.
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Cast Iron Pipe's record of maintaining high flow capacity throughout its long life is FACT not FICTION!

Carrying capacity without strength is like running a rickety car with a powerful engine . . . sooner or later it will shake apart.

Why choose between high flow, strength and long life when cast iron pipe gives you *all* of them?

Specify America's #1 pipe and your water system will serve long after the bond issue is retired.

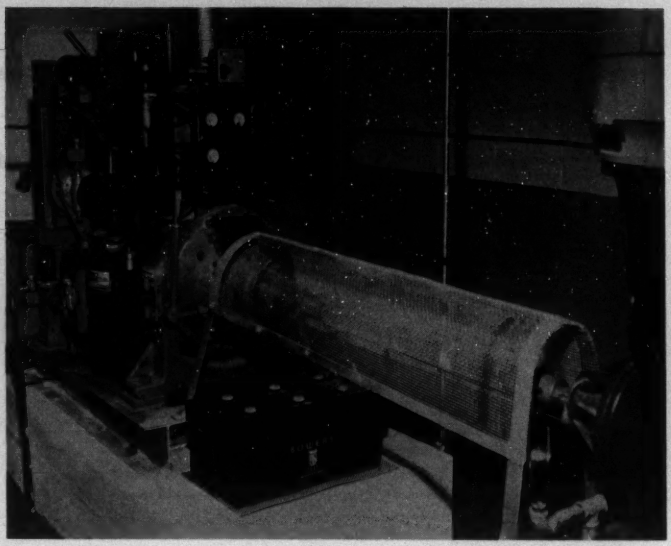
**Here is the proof!*

FLOW FACTORS FOR CEMENT LINED CAST IRON PIPE

LOCATION	SIZE	TEST SECT. IN FEET	VELOCITY F.P.S.	AGE YEARS	W & H "C" FACTOR
Bowling Green, Ohio	20"	45,592	0.7-2.4	New	142.5
Chicago, Illinois	36"	7,200	2.6-3.6	New	147
New Orleans, La.	12"	39,650	1.2-2.9	New	141
Corder, Mo.	8"	21,350	0.9-2.3	New	143
Univ. of Illinois	8"	400	3.14	New	150
Concord, New Hamp.	14"	500	1.7-2.2	New	151
Concord, New Hamp.	12"	500	2.0-3.4	11	142
West Palm Beach, Fla.	12"	500	3.6-5.4	15	139.5
Greenville, S. C.	30"	87,376	2.4-2.7	12	148.5
Corpus Christi, Tex.	30"	65,641	1.1-1.8	6	146
Summerville, S. C.	8"	500	1.98-2.43	13	142.5
Champaign, Illinois	16"	3,920	3.1-5.6	22	139.3

*Available upon request: Booklet containing flow test and tables on Cast Iron Pipe.

pipe FOR MODERN WATER WORKS



Diesel Engine Driven Pump Unit at Exeter Pumping Station, Exeter, New Hampshire

Recent additions at the Exeter Water Department, Exeter, N. H., included a new well and pumping station with a deep well 500 GPM turbine pump, right angle drive, and a 50 HP Cummins Diesel engine. Engineers for the new installation were John W. Durgin of Portsmouth, N. H., and Haley & Ward, Boston, Massachusetts. General contractor for the new station was S. E. LaPerle and Sons of Exeter, with pumping equipment furnished by Aetna Engineering Company of Alton.

Dependable Cummins Diesel power was chosen to insure adequate water supply in times of power outage.

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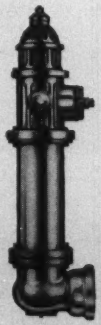

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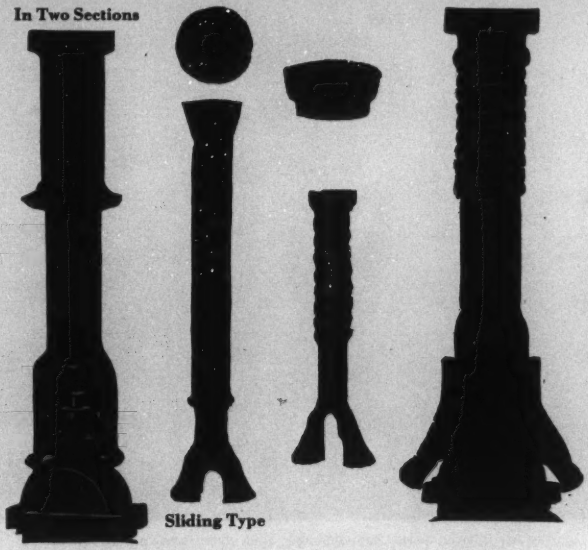

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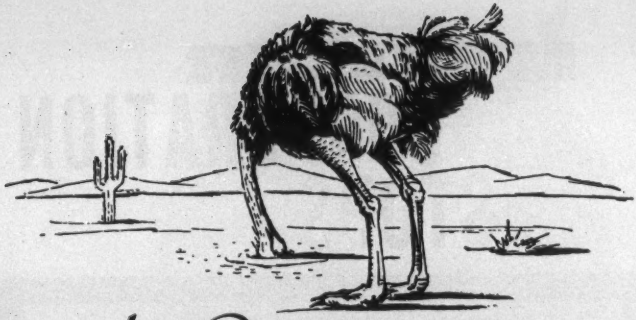
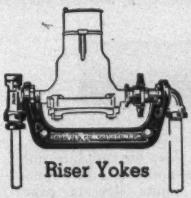


An Ostrich is an EXPENSIVE METER MAN



Riser Yokes

Angle Yokes

Straight Line Yokes

And so is anyone else who must stand on his head to set or change a meter. Old fashioned, hard-to-get-at connections, outdoors or in the basement, are time consuming and costly. Not only is the meter hard to change, but periodic efficiency checks are neglected and water revenues are lost due to inaccurate meters.

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You can change a meter in a Ford Yoke

EASILY

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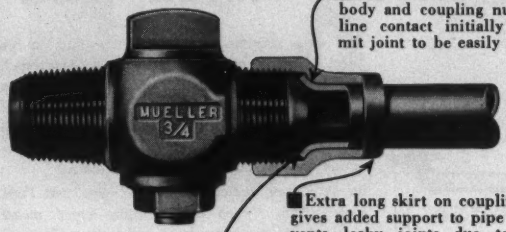

■ Convex surfaces on stop body and coupling nut give line contact initially — permit joint to be easily made!

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Sizes from ½" through 2"

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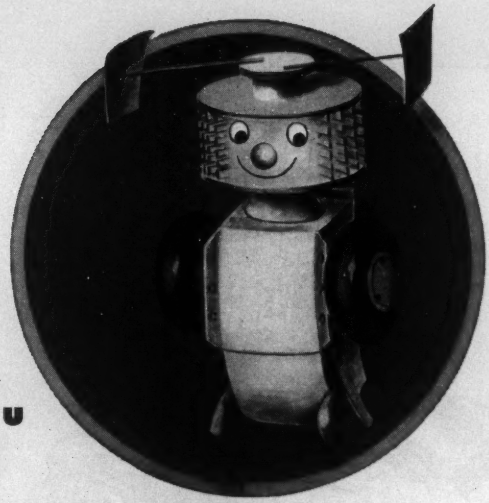

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CASE HISTORY: **How Badger PRP* helps communities meet rising costs without raising rates**

* Planned Rehabilitation Program helps city

account for 94% of water used

through annual "roundup" of defective meters

A near impossible record — but this Midwestern city did it! The community (name on request) began metering when it started its water system back in 1882. One of the nation's first cities to be fully metered, it initiated a planned meter rehabilitation program at the outset. Result: low water waste, high water revenue — as much as 94% of *all* the water used is "accounted for."

Badger's Planned Rehabilitation Program has helped communities all over the country keep their water systems on this same profitable basis. They're installing new, accurate Badger meters where it is economically feasible... new essential parts where only minor repairs are needed.

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If not, it's time your community held its own water meter roundup — to open the way to new revenue . . . end water waste from worn-out meters and parts . . . even help meet rising water department costs. Send for free booklet, "Take 5," outlining the 5 steps to increased revenue through Badger's Planned Rehabilitation Program.

And be sure to ask your Badger representative about our liberal water meter trade-in policy.

Badger Water Meters

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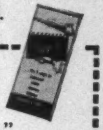
Research makes the big difference in meters Badger builds...

New features for water meters are constantly being developed and tested in Badger's engineering and research departments. Here a chemist inspects plastic specimens tested for dimensional stability. To his right, a test of registers operating under water determines corrosion resistance . . . and an electrolytic analyzer is making a quantitative analysis. From these tests and others will come still greater efficiency and proven durability for future water meters—first from Badger.



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Name_____

Title_____

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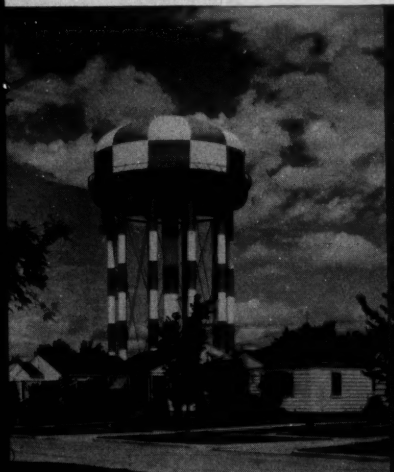

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forget frozen hydrants

use an

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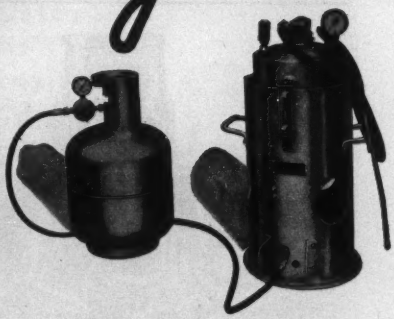

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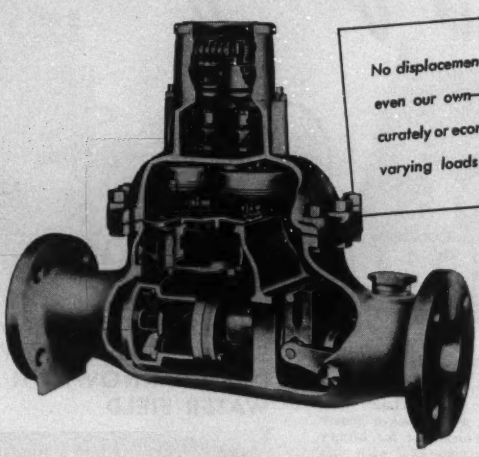

No displacement type meter—not even our own—can measure accurately or economically the widely varying loads of small industry.

WHEN TO USE A 2-INCH COMPOUND

When full range accuracy and maximum revenue are desired. To meet A.W.W.A. specifications, a Rockwell 2-inch compound must measure at least 95% of all water at flows of only ½ gpm. Displacement meters need only measure 95% at 2 gpm—at rates below that accuracy falls off fast.

When continuous flow rates are in excess of 32 gpm. The propeller unit in a 2-inch Rockwell compound meter is safely rated at 54 gpm for continuous operation. Displacement type meters are rated at only 32 gpm. Thus the *continuous flow rating* for the compound is 60% greater than the positive meter.

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another fine product by

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ABSOLUTELY TIGHT CLOSURE

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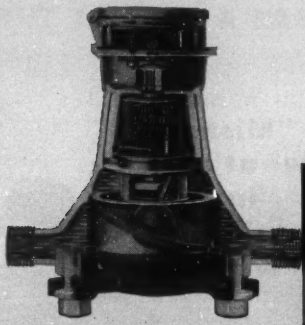

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WAKEFIELD'S WATER EMERGENCY AND SOLUTION

BY GEORGE R. WINTERS*

[*Read December 19, 1957.*]

On May 4, 1872, the Quannapowitt Water Co. was formed as a corporation to furnish the towns of Wakefield and Stoneham with water. The corporation, in the words of the act, "may take, hold and convey, into and through said towns, the waters of Lake Quannapowitt or Crystal Lake, or both, in the town of Wakefield, together with the tributary waters which flow to either in said towns; and may take and hold, by purchase or otherwise, such land, on and around the margin of such lake or lakes, or tributaries, not exceeding five rods in width, as may be necessary for the preservation and purity of said waters; and may also take and hold in like manner, such lands as may be necessary for erecting and maintaining dams and reservoirs, and for laying and maintaining conduits, pipes, drains and other works, for collecting, conducting and distributing such waters through said towns of Wakefield and Stoneham".

This same act also provided that either or both towns could purchase the franchise, property, rights and privileges of the corporation. It was not until 1902, after the corporation had changed its name to the Wakefield Water Co. and had constructed a pumping station and an engineer's residence, that the town of Wakefield bought the franchise and the property for $230,000.00. Prior to this, in 1901, the town of Stoneham had entered the M.D.C. system, and in 1903 the name was changed to the Wakefield Water Department.

Through the years many changes have been brought about in the system. The plant supplying Wakefield in current years consists of the pumping station at Crystal Lake, an auxiliary well field at Sexton Ave. containing 46 driven wells, and a dug

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well at Bay State Road. There are two standpipes: the first constructed in 1883 on Green St. in Stoneham with a capacity of 565,485 gal; the second constructed on Dillaway St. in Wakefield in 1927 with a capacity of 651,817 gal.

Water is filtered from Crystal Lake by means of two slow sand filters constructed in 1928, each with a capacity of 1 mgd. In 1956 this plant pumped a total of 584,154,580 gal, serving 6,042 service taps through 71.77 miles of distribution system.

These changes have come about as the town grew, and the people could see that their water supply was inadequate. As early as 1893 the town could foresee a shortage from its principal source, Crystal Lake. This lake covers approximately 85 acres and has a watershed area of less than one square mile. The estimated safe yield is between 600 and 650 thousand gallons per day, or roughly 40% of the town's current requirements.

Investigations were carried forward to secure new sources of supply in 1893, 1910, 1913, 1930, 1941, 1942, 1950, 1954 and 1955, so that it is safe to assume that all available sources of supply in the town of any magnitude have been exhausted, with the exception of Lake Quannapowitt. As a result of the investigations in 1930, the town began operations in what is now the Sexton Avenue Well Field by pumping from 15 2½-in. wells. In 1936, 12 additional wells were driven, and the permanent station was constructed in 1938. In 1941 18 more wells were connected. The safe yield of this system is estimated at 285 thousand gallons per day, or 17% of the town's current requirements.

In addition to this, in 1943 the town developed a dug well near Bay State Rd., which has a safe yield of approximately 110 thousand gallons per day, or less than 7% of the current requirements.

In extremely dry years in the past, the town has availed itself of a connection in Stoneham to relieve water shortages. Records show that purchases of water from Stoneham were made in 1930, 1936, 1943, 1949, 1950 and 1953.

In addition to the exploration for other sources, the town has made advances toward entering the M.D.C. system. As early as 1912 the town investigated joining the M.D.C. but evidently, due to what was then considered excessive costs, took no action. In 1951 negotiations were again opened with the M.D.C. and have continued until their culmination in town-meeting action

this year, when the town voted to connect with the M.D.C. to purchase one-third of its annual supply.

As can be shown, our safe yield from all sources in the town is slightly more than 1 mgd. Pumping in the town of Wakefield has exceeded that figure throughout this entire year. In fact, on particular days, our consumption has very closely approached 3 mgd. In order to augment the supply taken from our own sources, the town applied to the State Department of Public Health in May of 1957 for permission to take water through the emergency connection in Stoneham. On May 29th, permission was granted by the Department of Public Health, and we began pumping through this connection on June 1st. It became evident that even this source would not be adequate to supply the needs of the town, and on the 20th of June the city of Melrose took over a section of the Wakefield distribution system.

As our principal source of supply, Crystal Lake, began to drop, it became more and more apparent that other emergency measures must be taken. Prior to this, on the 5th of June, the Board of Public Works had issued a warning to the residents of Wakefield regarding water usage, and on the 19th of June had imposed rigid restrictions, barring all outside usage of water.

In search for an additional supply, Thomas Camp suggested to the Board the use of Lake Quannapowitt. Clearance had to be obtained from the Department of Public Health, as this lake is used for all recreational purposes, including bathing. After a thorough examination by the Public Health engineers, the lake was approved for use as an emergency water supply on the 24th of June, with the customary restrictions on the use of water and the further proviso that boating and fishing be allowed in the northerly end of the lake, well away from the intake pipe. It was further stipulated that persons using the boathouse adjacent to the new station on the southeast corner of the lake proceed directly to the west shore and follow the west shore to the north section, and return in the same manner.

As soon as approval was granted by the Department of Public Health, plans were drafted for erecting an emergency pumping station on the shore of this lake. On June 26th orders were placed for some of the equipment necessary for the construction.

The town was extremely fortunate in that Proportioneers,

Inc., of Providence, R.I., had five diatomite filters in various stages of production, which had not been ordered, and thus guaranteed delivery of these principal units within a month. In addition, the Fairbanks-Morse Co. was able to assemble two pumps having the required characteristics by taking motors and pumps from widely separated factories in the country and assembling them in Boston. Similar good fortune prevailed in scouting the country and finding other necessary equipment available for immediate delivery.

The firm of Camp, Dresser & McKee meanwhile sent out invitations for proposals to contractors in the field, advising them of the very critical emergency and requesting their bids on the construction and installation of an emergency station. This was done on the 2nd of July. On July 8th, Ralph P. Hall, Inc., was awarded the contract for the construction of an emergency water-treatment plant and pumping station, the work to begin immediately. The proposal called for the construction of a building large enough to house five diatomite filters and appurtenances necessary to provide filtration and pumping. A very rigid schedule was set up for delivery of the equipment to be installed, in order that the station might be in operation about the first week in August.

The plant was arranged with a 10-inch intake line, extending into the lake more than 100 ft and submerged in 7 ft of water.

The raw water is drawn by a 60-hp, 5-inch, Fairbanks-Morse, split-case centrifugal pump, with 13¾-inch impeller, and is chlorinated at the pump. Before the water is introduced to the diatomite filters, a slurry feed of diatomaceous earth is injected. After filtration the water is pumped in a second stage directly into the mains, with the same type of Fairbanks-Morse equipment used for the first stage.

In the specifications to Ralph P. Hall the town listed the following equipment to be furnished, the balance to be furnished by Mr. Hall:

5 Diatomite filters complete, capable of a filtration rate of 200 gal per min each;

1 Slurry feed system;

1 Chlorine-dioxide generation equipment for use with gas chlorinator;

1 Platform scale;

1 Totalizing-indicating-recording flow meter;

1 Precast slurry system;

15 4-in. Quick-opening valves for filter operation;

2 5-in. Fairbanks-Morse pumps with motors, 2 starters and 2 safety switches;

1 Portable, gas solution-feed chlorinator.

For the purposes of financing, a special town meeting was held July 1st, 1957, and the sum of $60,000.00 was appropriated for construction, together with $16,000.00 for operational costs. Later, an additional sum of $3,000.00 was appropriated, to carry the operation through this year.

To complicate the erection of the station further, it was discovered that the site selected was park property, and that an act of the State Legislature was necessary to allow a building of this size to be erected on the property. However, with the co-operation of the representative from our district, Mr. Gardner Campbell, such an act was passed immediately.

The schedule for completion of the work was further delayed, due to the ready-mix concrete strike at that time, and the subsequent shortage of cement. However, with the co-operation of local union officials we were able to have the foundation slab poured with only one day's deviation from schedule.

On the 9th of July, the ground was broken for the erection of the station. Through excellent co-operation on the part of the firms of Camp, Dresser & McKee and Ralph P. Hall, Inc., the station was in operation and pumping to waste on the 2nd of August.

The co-operation of engineer and contractor in this case cannot be overemphasized, for it is apparent that the consulting engineer had very little time to prepare adequate plans for the construction, and that, of necessity, the contractor proceeded most of the time with verbal instructions from the resident engineer on the job. The total time elapsed between authorization by the town to the consultants and the actual delivery of filtered water to the mains was approximately six weeks.

As an emergency solution to Wakefield's water problem, the station has provided the stop-gap necessary to keep the town from imposing further restrictions on water use. However, it has meant that we are operating our total plant on an hour-to-hour basis, and there is no allowance for breakdowns.

The water obtained from the Quannapowitt filter station is of necessity very expensive. Since there is little or no salvage value to the equipment, the entire cost of the plant must be written off. In addition, to provide the town with the 700,000 gpd produced at this plant, an operator must be in attendance throughout the 24 hours. This requires three operators. Diatomaceous earth used as a filter aid is very expensive, and more than a ton of the material is used each week. The cost per mil gal of filtered water, based on one year's operation and writing off the cost of the physical plant in that year, will approach $400.00. Considering the very critical shortage and the time element, it has actually served its purpose by providing potable water at a time when no other answer could be provided. There has been criticism that $400.00 per mil gal is excessive, but no suggestion as to any alternate solution has been advanced. To give an example of the filters' effectiveness, analysis has shown that the filtered water contained no coliform organisms; algae had been completely removed; turbidity had been reduced from 20 ppm to 1 ppm, color from 90 to 15, and iron and manganese from 1 part to 0.14 part. It is our plan to continue operation of this plant until the completion of our 20-inch connection with the M.D.C. system, which is now under construction, and to have it available as a stand-by for any future emergency.

The 20-inch connection, voted by the town in 1957, will begin at the 36-inch pressure main in the Lynn Fells Parkway at Vinton St. in Melrose, and from Vinton St. a 20-inch main will connect with the Wakefield system at Main and Nahant Streets.

The firm of Camp, Dresser & McKee is developing plans for the proposed pumping station, to be built in conjunction with this line. By the terms of the agreement with the M.D.C., the town must purchase ⅓ of its total supply from the M.D.C. and may be limited by the M.D.C. to not more than 1 mg in any one day. If the work proceeds as scheduled, the town will gain relief from this connection about June 1st, 1958. This connection should provide the quantity of water necessary to solve our problem for approximately ten years. In the interim the town can face the task of procuring an adequate supply for a longer period of time.

THE MANAGEMENT OF FORESTED WATERSHEDS IN NEW ENGLAND

BY HOWARD W. LULL* AND NORMAN R. TRIPP†

[*Read February 20, 1958.*]

As water supplies become more and more critical, from the standpoint of both quantity and quality, the management of the lands that yield this water assumes increasing importance. Also, the need for management know-how becomes ever more urgent, as public pressure to make these lands furnish other economic and social benefits increases. Since in New England so great a part of the watershed lands are forested, this problem becomes largely one of forest management.

In this business of supplying water for domestic and industrial use, we have two major concerns. First, water must be available in sufficient supply at the time it is needed; and second, the quality of water must meet acceptable standards for the use to which it will be put.

Of these two, quantity is the more important. For a price, it is possible to treat almost any water to bring it up to a usable standard, but we must have a sufficient supply.

Moreover, any management plan to increase the yield of a watershed must be influenced by present or potential reservoir storage capacity within the watershed. Treatment designed to increase total yield, but which adds this increase primarily at the time of peak flows, will avail nothing without storage capacity to retain the increase. For a better understanding of the possibilities and limitations of watershed treatment, let us briefly review our knowledge of how a watershed operates.

Water Yield and Timing

First, the amount of runoff—total yield—is equal to the total precipitation minus water losses by evaporation and transpiration. No practical means of increasing precipitation has yet been

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discovered; thus, runoff can only be increased by decreasing evaporation and transpiration. The amount of water lost through evaporation and transpiration is related to the amount of solar energy received, the amount of rainfall, and the type of plant cover. Since we have no control over solar energy or rainfall, reduction of this loss can be achieved only by altering the amount or type of plant cover.

Next, the time and duration of runoff are a result both of certain inherent watershed characteristics and climatic factors over which we have no control, and of the percentage of runoff that occurs as overland flow—over which we do have considerable control. The greater the percentage of overland flow, the higher will be the flood peaks and the lower the safe minimums. The land manager exercises control of this factor by encouraging conditions that promote infiltration of precipitation into the soil.

Regulation of Flow

This brings up a logical question: Is a forest the best type of cover to protect the watershed and regulate flows? To help answer this question, let's see what the forest cover does.

First, because its canopy is dense and strong, a forest affords to watershed soils the best possible protection against compaction by rain and damage by erosion. This same heavy canopy furnishes the organic material to build a thick layer of humus.

Humus or organic mulch protects the surface of the soil against puddling and sealing and thus allows more water to infiltrate; mulch adds organic compounds that help improve soil structure or "tilth"; it also provides favorable growth conditions for minute organisms and burrowing insects, which further aid in opening and aerating the soil. All in all a layer of humus provides the most favorable condition for entrance and storage of water in the soil.

It is this water percolating down through the soil and later appearing as sub-surface or ground-water flow that maintains springs and stream flow during dry periods. And by this process of getting more water into the soil and retaining it there longer, we try to reduce flood peaks and increase low flows. The degree to which any particular combination of soils and cover is able to

perform this function is known to the land manager as hydrologic condition or hydrologic efficiency.

However, getting these very desirable conditions on your watershed is going to cost you something in terms of water loss. On an annual basis, a northern hardwood forest will intercept and evaporate back into the atmosphere about 15% of the precipitation that falls on it—a spruce-fir stand about 35%. The percentage for the conifer stand is higher because this type is much more effective in intercepting (by catching in its thick needles) the snowfall that makes up a large part of the precipitation in our region. In addition, water use or transpiration by the tree cover will bring the losses up to from one-third to one-half of the total precipitation. This is what has been called the "water cost of runoff control"—in other words, the payment we must make to maintain even stream flow and keep sediment out of our reservoirs and water systems. This water cost will continue as long as the forest cover is maintained and protected—with growth and age the cover may even intercept and use more water.

Other forms of plant cover—brush or grass—have the same advantages and disadvantages, but in lesser degree. Savings on water cost, if any, are offset by loss in protection and regulation.

Reducton of Water Losses

This combination of circumstances brings us to a second question: Is it possible to have a good forest cover but to reduce the water losses by forest cutting?

We have finally begun forest-cover and water-yields research at the Hubbard Brook Experimental Forest on the White Mountain National Forest, near West Thornton, N. H. Here we hope to learn what may be done under New England conditions, but as yet no research has been completed that gives us quantitative answers. So for the time being, the best we can do is to study research from other parts of the country, attempt to interpret it in light of New England conditions, and make some tentative predictions of the direction in which we may expect our answers to go.

Most of this kind of work has been completed at the Coweeta Hydrologic Laboratory in western North Carolina.[1] Conditions

[1]A recent publication, *A Guide to the Coweeta Hydrologic Laboratory*, by R. E. Dils, Southeastern Forest Experiment Station, U.S. Forest Service, Asheville, N.C., 1957, summarizes results of this research.

there vary considerably from those in New England. The rainfall averages about 80 inches; soils are deep; the forest cover is principally hardwoods, and snowfalls are rare. Still, something can be learned from their experiences.

For example, in one unique experiment, designed to measure water loss due to transpiration, the complete tree cover on a small watershed was cut with great care not to disturb the humus and litter on the ground surface. Tree sprouts and seedlings were cut back each year for the next 13 years. The first year after cutting, the increase in total water yield amounted to about 17 inches. Over the years following, it dropped somewhat and has finally levelled off at about 11 inches, about a 25% increase in flow.

The treatment given this watershed could not be duplicated under any form of practical management operation, but it is interesting in that it probably shows the extreme increase in yield that can be expected anywhere in the eastern United States. Under New England conditions of soil and growth, and under some form of practical management, it is doubtful if more than half this increase could be realized.

(Consider also that New England is naturally forested country. Clear-cut your watersheds and, unless you take strenuous and expensive measures, the trees will grow back. They may be smaller and different trees, but they will still use water.)

In a second study at Coweeta, the same tree-removal procedure was followed, but the forest cover was allowed to grow back. In this case the first year's water-yield increase was about 14 inches. As more trees and shrubs grew back the increase declined to 4 inches, or about 10% by the fifteenth year. Projecting the results into the future suggests a negligible effect after the 35th year.

In a third project, a dense understory of laurel and rhododendron was removed. The first year after treatment runoff increased about 3 inches. Six years later the increase was 1½ inches with a predicted "no effect" in ten years.

For a fourth study, all the vegetation was cut in a strip along the stream channels. The area cut amounted to 12% of the total watershed. The increase in water yield was proportionate to the area treated and similar to that of the other watersheds. There were no indications that the riparian vegetation on

this North Carolina watershed used a disproportionate amount of water.

In all of these experiments there were no measurable changes in storm peaks, volumes of storm flow, or in the distribution of storm runoff. However, we believe that this resulted from the care given to protect the humus and litter layers from disturbances—high infiltration rates thereby being maintained. This would lead to the conclusion that the ideal situation, from the standpoint of both total yield and increasing low flows, would be to have undisturbed forest-floor conditions but with no tree cover —an obvious absurdity. And yet, the science or art of watershed-forest management is a continuing attempt to compromise between these two extremes.

Little is known as to the effect of partial cuttings on water yield. Indications are that a fairly heavy cut must be made to get an appreciable increase. This reasoning is based on studies that have shown the great amount of overlapping of root systems within a forest stand. For example, the area of roots of trees in a deciduous forest in Massachusetts was found to be four times greater than the canopy spread. Under these conditions the removal of only a few trees cannot be expected to have much effect on the network of roots through which water is removed from the soil.

Hardwoods or Conifers?

A third question that often puzzles the watershed manager is: What is the best forest type—hardwood or conifers? Which should be used for reforestation?

In a snow country such as New England, planting or managing for pure stands of conifiers is a doubtful practice. True, their dense shade prolongs snow-melt and may thus maintain a high soil-moisture condition later in the spring. However, this gain may be more than offset because conifers intercept much more snow that, resting on the foliage, evaporates back into the atmosphere. Conifers also may use slightly more water in transpiration. The creation of impermeable ground frost is also more common under conifer stands and, because of their dense shade, this frost remains later in the spring. Thus, less snow-melt water is able to percolate into the soil, and more overland flow may occur.

Pure stands of conifers are also very susceptible to attacks of forest insects and diseases. As an example, about a hundred acres of red pine, planted to protect the shoreline of the Bridgeport, Connecticut, reservoirs, were recently killed by an infestation of scale.

Many watershed-forest managers believe that interplanting conifers in hardwood stands offers the best solution. This practice lessens the chance of total losses from pest attack. But more, it combines the desirable qualities of greater snow accumulation and permeable frost, found in hardwood forests, with the shading and snow-melt-retarding ability of conifer stands.

Whichever type is used for planting, no sudden changes in water yield should be expected. Seedling-size stock, planted 6 x 6 feet, hardly constitutes a formidable drain on soil-moisture supplies nor has much effect on soil shading or mulch accumulation. If planted on a bare area, once the roots had penetrated below a depth of one to two feet, evapo-transpiration would begin to exceed previous evaporation, and water yield would be correspondingly less. If planted in competing vegetation, the effect on water yield would doubtless be slower, depending largely on whether the roots would eventually occupy a greater depth than the existing cover.

Silt in the Water

So far we have been talking primarily about water yield and the regulation of flow. Another major consideration is that of water quality. Since forest-management activities do not normally add chemical or biotic pollutants to the water, the forest manager's concern with quality is mainly centered around silt production and water temperature.

Cool, clear water, in addition to its aesthetic appeal, also has some practical advantages. Water temperature is important in many industrial processes (particularly for cooling), and a few degrees drop in temperature may mean the saving of thousands of dollars. Besides creating a disagreeable color, and possibly taste, silt in the water supply clogs boilers and water mains, reduces reservoir capacity, and increases the cost of treatment. It also has other bad effects where recreation or sport use are important.

Fortunately, the same watershed-forest conditions that tend to regulate flow best also give us the best quality. Water which has percolated down through the soil is both cool and clear.

Any attempt to increase total water yield by creating conditions resulting in overland flow inevitably initiates soil erosion, the production of sediment, and a resultant debasing of quality.

Logging and Water Quality

Another question that is often asked is: Can a municipal watershed forest be logged without damaging water supplies?

This is an important consideration, since the possible income from a well-managed forest of even a few hundred acres is a very real attraction. As we have already seen, light or moderate selective cuts probably have little effect on water yield or peak discharges. The principal danger is the possible effect on water quality.

Cutting and removal of forest products require a road system which, unless designed, constructed and maintained with great care, may increase surface runoff and erosion. Mileage of the system must be held to an absolute minimum. It must be well-drained and so located that runoff and silt cannot reach stream channels. Provision must be made for stabilizing the exposed soil after the road has served its purpose. Nothing could be less compatible with forest protection for watershed purposes than carelessly bulldozing a road through an otherwise undisturbed cover.

An example of the damage that may result from an ill-conceived road system was shown by a recent study on the Fernow Experimental Forest in West Virginia. Here, a mountain logging operator was allowed to build roads in a watershed according to the usual practice on unmanaged forests in that part of the country. Before logging, the highest measured sediment load for moderate flows from this watershed was 27 ppm. After logging and road-building, a sediment load of 50,000 ppm was recorded from the same watershed. In another experiment in North Carolina, runoff from a small watershed, logged by usual methods, reached a maximum turbidity of 7,000 ppm, as compared with 80 ppm on a comparable undisturbed watershed. Over a four-

year period, nearly 7,000 cu yd of soil were lost from less than 2½ miles of road.

Another measure of the effect of unplanned logging can also be gathered from the total area usually disturbed. Normally skid trails and haul-roads take up from 15 to 20% of a logged area, but the total area over which equipment moves—compacts the soil and tears up the humus layer—may run as high as 40%.

Logging is being carried out successfully on many watershed areas. However, it requires skilled technical advice and assistance. Two rules-of-thumb are useful in road building. The first concerns location of the road in relation to the stream: starting with a strip 50 feet wide on level land, the width of strip should increase 4 feet for each 1% increase in slope of the land between road and stream. The second rule-of-thumb deals with drain spacing: distance between drains (in feet) should equal 1,000 divided by road grade (in percent). Thus, on a 20% grade, surface drains would be installed every 50 feet.

Summary

In summary, let's return to our four questions and give you our ideas of what the answers might be.

Should municipal watersheds be forested?

From the standpoint of water-quality protection and flow regulation, forest cover is probably the best. It uses more water than a shallower-rooted herbaceous cover, but it is easier to maintain and provides additional income. In time, as water demands increase, modification of plant cover to increase water yield may be necessary in some critical areas.

Can water yields be increased in New England by forest cutting?

We think so. But the answer to "how much" will have to wait until some later date, when we can present results from Hubbard Brook research. Meanwhile, if some cutting seems justified under your conditions, try it on an experimental basis first—but before doing so, we suggest you write the Northeastern Station for advice.

Should the forest cover be hardwood or conifer?

From the standpoint of water use, for New England conditions, there's probably not too much difference. Conifers do extend the period of snow-melt and may thus, for some water systems, extend the period of use of winter precipitation. Both types give good watershed protection, with the exception that frost is more prevalent under conifers, and runoff from spring rainfall and snow-melt may be greater. Where possible, we favor mixed stands.

What effect does logging have on municipal water supplies?

Done carelessly, logging can easily create a water-quality problem. As far as water yield goes, only a very heavy cut will make substantial increases. The increase in peak flows may be greater than the effect on water yield.

* * * *

As you can well understand from our discussion, this is a complex subject. The experimental work necessary to find conclusive answers to our questions is time-consuming and expensive. We in the Forest Service, working in cooperation with many other agencies, are pushing ahead as rapidly as we can—the Northeastern Experiment Station to uncover possibilities—the National Forests to test the possibilities and demonstrate their usefulness under practical management. We are always glad to pass on the benefits of our experiences. We hope you will take advantage of them.

CROSS-CONNECTIONS WITH HEATING SYSTEMS CONTAINING CORROSION INHIBITORS

BY FRANCIS J. LARIVIERE*

[*Read at Meeting of Superintendents and Chemists, March 20, 1958.*]

Some time ago we ran upon a situation in New Hampshire which we think would be of interest and worth bringing to the attention of the water-works people of the Association. We don't propose to offer any solution, because we have kicked this thing around a number of times without arriving at a really satisfactory solution. Rather it is hoped that, by presenting the facts and the circumstances and perhaps promoting a discussion, some satisfactory answers might evolve.

A letter received from Ted Cate, Superintendent of the Laconia Water Works, informed us that a wholesale plumbing and heating supplier had been in touch with him regarding the possible danger of contaminating the public water supply with a corrosion-inhibitor compound, used in steel, domestic, hot-water heating units automatically fed from the water supply. This situation took place on Gilford Ave., which is high in elevation, thereby creating a condition of low static water pressure of 25 lb. The heating unit in question was installed in a small greenhouse adjacent to the main house. Both the heating unit and the greenhouse were furnished with water through a ½-inch copper pipe that branched off a ½-inch supply line, serving the kitchen sink in the house. The usual ¾-inch copper service serving the property was of normal length, such as would be found in modern housing developments. A pressure-reducing valve, adjusted to maintain 12 psi on the boiler, had been installed without any check-valve protection whatsoever. Due to flow conditions, the pressure within the house system apparently dropped below 12 psi, and chromium solution, used as an inhibitor in the boiler, was forced back into the house water system. A sample submitted to our laboratory from the house system showed a chromium concentration of 200 ppm. The chromium compound in question

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was of unknown brand. However, it was reported that it was in a prepared powder form. Since then it has been found that a great many concerns manufacturing steel boilers furnish a quantity of such a compound when the boiler is purchased. It was not known whether or not the two occupants of the property consumed any of the contaminated water. However, subsequent medical observations did not reveal any ill effects, as far as could be determined. The owner of the property, a part-time florist, threatened to make claim for damages on the plumbing-supply house that furnished the equipment, for the loss of several valuable plants that he claimed had been watered with this chromium solution. Since this occurrence, a check-valve has been installed on the supply line to the boiler, and no further difficulty has been experienced.

There is widely varying opinion on the permissible quantity of chromium that the human body can withstand. There is evidence that 10 ppm in water for several days only caused marginal ill effects. Some establish the lethal dose at 3 grams. Others feel that the pronounced yellow color even at low concentrations serves as adequate warning. However, this cannot be relied upon to prevent the consumption of chromium-contaminated water.

Looking further into the problem, we discovered that an identical situation could occur if the water service was shut off for the repair or maintenance of the plumbing system and the valve serving the heating unit was neglectfully left open. Obviously, the same would occur if the pressure was reduced below 12 psi, due to an interruption of service or heavy fire demands, and the water-supply system could be contaminated with chromium compounds even in areas of substantial static pressure.

We got in touch with the manufacturers of the pressure-reducing valve and were informed that at the time the State of Illinois was in the process of investigating the use of chromium compounds, and that a meeting in Chicago was planned in the near future between steel boiler manufacturers and manufacturers of accessory equipment, to discuss means of protection. Obviously this meeting of interested parties brought forth the question of using other compounds of a non-toxic nature for corrosion control. As a result the Steel Boiler Institute undertook the task of conducting accelerated tests with other compounds.

Recent communication with the Steel Boiler Institute indicates that a report of these tests is about to be published. However, they state that none of the compounds tested proved as satisfactory as chromate in steam boilers. Regarding hot-water boilers, it was reported that some difficulty was experienced with chromate, and that a non-chromate material was being experimented with. No mention was made of its toxicity. It would seem that boiler manufacturers feel that the need for corrosion control is great enough to justify this experimentation.

Correspondence with the State of Illinois has indicated that already steps were being taken to exercise control in this respect, and that tentative rules were being formulated.

To date several proposals have been offered for correction of this problem:

1. The first and by far the safest is complete separation of the two supplies where a conditioning compound is to be used. This would involve the installation of a small booster pump, fed from a water tank physically broken from the public water supply. To be effective this method of correction would require that some control be exercised, to make sure that if these units failed or required maintenance, the heating unit would not be connected directly with the water supply again. Obviously, inspection would present a problem that could hardly be undertaken by local or state agencies.

2. The second method of correction would involve the use of double check-valves with test connections. This again, in order to be effective, would require that the checks be periodically checked for tightness. With such a large number of installations involved, needless to say, a local or state agency could not handle this kind of a work load.

3. The third method, involving the use of a vacuum breaker, is totally unsatisfactory, inasmuch as back flow could take place at any pressure below 12 psi without ever developing a negative pressure on the public supply.

4. The fourth method would be to prohibit the use of toxic compounds, and this could be accomplished by controlling the availability of the product through plumbing and heating supply houses.

5. The fifth method would involve the installation of single

or double checks in the supply line to the boiler, which would not afford complete protection, inasmuch as health authorities do not recognize check-valves without testing provisions for tightness.

6. The last method is complete elimination of automatic water feed. In this connection one plumbing supply house has indicated that, because of difficulty with pressure-reducing valves, they have been recommending that these units be installed with a manual feed, similar to a great many steam installations, where the property owner periodically checks the level or pressure on the system and replenishes the supply manually as the need arises.

In summarizing we have the following:

1. Contamination of a water supply with a toxic compound from a hot-water system can take place. The frequency of such contamination is unknown, but presumably it may occur whenever the pressure drops below the pressure-reducing-valve setting, unless the supply is properly protected.

2. The steel-boiler industry apparently realizes the hazard involved and has already instituted studies to find substitute compounds.

3. Present methods of correction are not entirely satisfactory, outside of prohibiting the use of such compounds. The last method mentioned, which involves the elimination of the automatic-feed feature, holds promise although not proven practical as yet.

PROCEEDINGS

Seventy-Sixth Annual Convention

Poland Spring House, Poland Spring, Maine

September 14-17, 1958

The Seventy-Sixth Annual Convention of the New England Water Works Association was held at the Poland Spring House, Poland Spring, Me., on September 14-17, 1958.

The technical sessions of the convention were held in the ballroom of the Poland Spring House; the Manufacturers' Exhibits were located in the ballroom and adjoining rooms.

Monday, September 15

Morning Session

President George G. Bogren in the Chair.

The Annual Reports of the Secretary, Treasurer, Editor, Committee on Membership, Finance Committee, Scholarship Committee, Committee on Committees, Committee on Legislation, and Committee on Reciprocal Relations with the Institution of Water Engineers were presented and accepted.

The President declared the polls closed and appointed as Tellers of Election W. S. Pratt, E. S. Littlefield and C. H. Reed.

The following reports of technical committees were presented and accepted: Committee on Rainfall and Yield of Drainage Areas, Committee on Coefficients for Friction in Pipe Lines, Committee on Specifications for Cast-Iron Pipe and Fittings, Committee on Standardization of Pipe Flanges and Fittings, Committee on Deep-Well Vertical Pumps, Committee on Conservation, Development and Utilization of Water Resources, Committee on Recreational Use of Public Water Supplies, Committee on Plastic Pipes and Plastic Linings for Water-Supply Uses, and Committee on Water-Works Safety Practice. All formal reports are published in this issue of the Journal.

On motion duly made and seconded it was VOTED to adopt the following resolution:

A RESOLUTION CONCERNING RECREATIONAL USE OF PUBLIC WATER SUPPLIES

Whereas:

Man is a carrier of disease, and
There are reservoirs of infection still prevalent, and
Interstate and international travel is heavy, and
Man's natural immunity is constantly lessened by his excellent sanitary environment, and

Whereas:

Water is still a potential disease-transmission medium, and
The results of laboratory testing are so delayed as to allow infection of a community not protected by proper sanitary controls of its water supply, and
Treatment facilities and processes are not completely infallible, and
There have been recent experiences of gross pollution of supplies where recreation was allowed.

Now, Therefore, Be It Resolved:

That the New England Water Works Association opposes legislation or administrative action that will permit or require the opening of domestic water-supply reservoirs and adjacent lands to recreational use,

And Be It Further Resolved:

That the New England Water Works Association registers its approval of the policy to maintain the control of domestic water-supply reservoirs in the hands of the State Health Agencies and of the Water Purveyors and of the Consumers.

Afternoon Session

President Bogren in the Chair.

Secretary Knox announced the election by the Executive Committee of the following new members: Samuel C. McLendon, Partner, H. G. Holzmacher & Asso., Consulting Engineers, Seaford, N. Y.; William P. Jenkins, Superintendent, Old Town Water District, Old Town, Me.; Norris I. Stephens, Treasurer and Clerk, Kennebunk, Kennebunkport and Wells Water Dis-

trict, Kennebunk, Me.; John M. Murray, Manager of Water Utilities, Orono, Me.; Lawrence W. Raymond, Superintendent of Streets and Water, Bellows Falls Village Corp., Bellows Falls, Vt.; Marion A. Packard, Jr., Superintendent, Kennebunk, Kennebunkport and Wells Water District, Kennebunk, Me.; Robert B. Boyd, Jr., Town Engineer and Purchasing Agent, Walpole, Mass.; Edward F. Harrington, Manager, Water Department, Norwalk, Conn.; Robert F. Holzmacher, Consulting Engineer, Hicksville, N. Y.; V. Walter Adams, Sales Representative, Centriline Corp., Wellesley, Mass.; Alfred A. Melien, Jr., Superintendent of Public Works and Town Engineer, East Longmeadow, Mass.

Associates

The Bristol Co., Waterbury, Conn.; DeLaval Steam Turbine Co., Trenton, N. J.

A paper on "Lake Whitney Sanitary Conditions in Relation to Certain Laboratory Examinations," prepared by Samuel Jacobson, Director of Laboratory, New Haven Water Co., New Haven, Conn., and Everett L. MacLeman, Associate Professor, School of Engineering, Yale University, New Haven, Conn., was read by Professor MacLeman.

A paper on "How Supervisory Control Can Help New England Water Systems" was read by Bamby L. Soscia, Application Engineer, Builders-Providence, Inc., Providence, R. I.

A paper on "Occurrence of Water in Buried-Valley Deposits" was read by David W. Miller, of Geraghty, Miller and Hickok, Consulting Ground-Water Geologists, New York, N. Y.

Evening

Through the courtesy of the Water and Sewage Works Manufacturers Association, a Harvest Jamboree was enjoyed in the Playhouse.

TUESDAY, SEPTEMBER 16

Morning Session

A paper on "Electrolysis as It Applies to the Water-Works Superintendent" was read by Francis N. O'Hara, Superintendent of Public Works, Arlington, Mass.

A talk on "New Developments in Power Operation of Water-Works Valves" was given by Payne Dean, Payne Dean & Co., Clinton, Conn.

A paper on "Proposed Improvements to the Northern Extra-High-Service Distribution System of the Metropolitan Water District (Boston)" was read by Stephen E. Dore, Jr., Engineer, Coffin & Richardson, Inc., Boston, Mass.

Evening

The New England Water Works Association presented a Stelliferous Revue by a selected group of top-flight entertainers.

WEDNESDAY, SEPTEMBER 17

Morning Session

A paper on "Investigation of Liquid-Alum Flow Measurement" was presented by Kenneth F. Knowlton, Superintendent, Salem-Beverly Water Supply Board, Beverly, Mass., and Russell H. Babcock, Manager, Water and Waste Division, The Foxboro Co., Foxborough, Mass.

A paper on "Advantages of Steel Tanks for Water Storage" was presented by J. Edgar Revelle, District Sales Manager, Chicago Bridge & Iron Co., Boston, Mass., and John A. Morley, New England Representative, Pittsburgh-Des Moines Steel Co., Newark, N. J.

A paper on "Current Affairs in the Water-Supply Service in Great Britain" was presented by Charles A. Risbridger, Chief Engineer, Water Department, Birmingham, England, and President of the Institution of Water Engineers, London.

Afternoon Session

This session was devoted to a panel discussion on "Water Works Management." Papers were read as follows:

"Office Procedure," by Mark F. Croker, Commissioner, Water Department, Newton, Mass.

"Engineering and Operation of the Water System," by Peter C. Karalekas, Chief Engineer, Water Works, Springfield, Mass.

"Public Relations and Personnel," by William H. McGuinness, Superintendent, Water Department, Cambridge, Mass.

"Water-Works Accounting," by Richard G. Small, Assistant Treasurer, Portland Water District, Portland, Me.

Evening

Through the courtesy of the Water and Sewage Works Manufacturers Association, a social hour was enjoyed in the ballroom of the hotel, after which dinner was served in the main dining-room.

President Bogren introduced the chairman of the Awards Committee, Mr. Harold J. Toole.

AWARD OF THE DEXTER BRACKETT MEMORIAL MEDAL

HAROLD J. TOOLE. Mr. President, distinguished guest, members and guests of the Association: In 1916 the New England Water Works Association established the Dexter Brackett Memorial Medal, to honor and perpetuate the memory of an engineer who for many years made numerous outstanding contributions to the water-works profession. This award is made annually to the member or members of the Association who have contributed the most meritorious paper printed in the JOURNAL during the preceding year.

Dexter Brackett was employed as a Water Department Engineer by the city of Boston for about twenty years prior to his appointment as Engineer in Charge of the Distribution Department of the Metropolitan Water Board, when this board was organized in 1895. He was appointed Chief Engineer in 1907 and served in this capacity until his death in August, 1915. He was President of our Association in 1889 and 1890 and was Editor of the JOURNAL for many years.

This year your Committee on Awards, consisting of Dr. Donald R. F. Harleman of Cambridge, Kenneth F. Knowlton of Beverly, and myself, are of the unanimous opinion that the most meritorious paper published in the JOURNAL in 1957 was "Maintaining Pipeline Coefficient C after Water-Main Cleaning" by William D. Monie and Harold B. Scales. Mr. Monie is Chief Engineer and Mr. Scales is the Chemist of the Portland Water District of Portland, Maine.

Will Mr. Monie and Mr. Scales come forward? [*Applause.*]

Mr. Monie and Mr. Scales, it gives me great pleasure to present to you on behalf of the New England Water Works Association these Dexter Brackett Memorial Medals. Mr. Scales, you must appreciate this; I notice on the record that on several occasions you have had the privilege of making these awards. It is nice to have you on the other side of the table.

HAROLD B. SCALES. Thank you, Harold. I am sure that both of us appreciate it very much.

WILLIAM D. MONIE. In accepting this award we should like you folks to know that we greatly appreciate the honor, but we know that we share it with many of the employees of the District, who did some very conscientious and fine work in supplying us with the data which we compiled into the paper. Thank you very much. [*Applause.*]

COMMEMORATIVE AWARD

HAROLD J. TOOLE. The Commemorative Award was established by the Association in 1949, to be given each year to the member of the Association submitting the paper judged next in merit to the one receiving the Dexter Brackett Memorial Medal. This year the Commemorative Award is made in memory of George H. Finneran. Mr. Finneran was associated with the Boston Water Department for more than forty years and was its superintendent for twenty-five years prior to his retirement in 1934.

He was co-designer of the B and F hydrant, used by the Water Division, and a mechanical closing device for large gate valves.

Mr. Finneran was a prolific writer on water-works subjects and contributed nine papers to the JOURNAL of the Association. A member of the New England Water Works Association since 1906, he served as President during 1930-1931.

This year the award is made to Francis N. O'Hara, Superintendent of Public Works of Arlington, Massachusetts, for his excellent paper, entitled "Pressure and Volume Survey in Arlington, Massachusetts."

Mr. O'Hara—Francis—it is my privilege and pleasure to give you this Commemorative Award. We have worked together in the Water District for many years, and our relationship has been most pleasant. [*Applause.*]

FRANCIS N. O'HARA. Mr. Chairman, Mr. President, members and guests of the New England Water Works Association:

It is with a great sense of honor and a deep feeling of humility that I accept this award from such a renowned and distinguished organization. I thank you. [*Applause.*]

* * * *

PRESIDENT BOGREN. Another pleasant duty I have now to perform is the presentation of certificates for twenty-five years of service to one community and membership in the New England Water Works Association for the same period. The re-

cipients are Mr. Mark F. Croker, Water Commissioner of Newton, and Mr. Warren A. Gentner of Hartford. [*Applause.*]

This year for the first time the scholarship for which the committee has worked hard is coming to fruit, and there is an award to be made tonight. I am going to ask Chairman William B. Duffy of that committee if he will step forward and report the deliberations of that committee.

WILLIAM B. DUFFY. President Bogren, and members of the New England Water Works Association, ladies and gentlemen:

The New England Water Works Association program, proposed at the Annual Convention in September, 1954, and adopted by the membership by ballot in May, 1956, has now become a reality, with the fund amounting to $10,230.06 towards the goal of $25,000 and with accrued interest of $320.66 as of September 1. It is now possible to make a scholarship loan or grant from the income of the Scholarship Fund to members and junior members, in accordance with the Scholarship Program.

Frank A. Wyskiel, a Junior Member of the Association since August, 1957, has been granted a $300 scholarship. He is a resident of Manchester, New Hampshire, and worked during the summer of 1957 for the Manchester Water Works. He is a student in the course in Sanitary Engineering at Cornell University, Ithaca, New York.

The Scholarship Committee thanks the contributors for their support in attaining the initial Scholarship Fund goal of $10,000 and urges all members to continue their financial support of the program.

Respectfully submitted, William B. Duffy, Chairman, Thomas R. Camp, Vice Chairman, Richard M. Cleveland, Secretary, William P. Melley, Treasurer, Richard N. Berry, Roger W. Esty and Kenneth F. Knowlton. [*Applause.*]

PRESIDENT BOGREN. Thank you, Mr. Duffy.

Another very pleasant duty I have to perform on behalf of the Association is the honoring of three men who have been picked out to receive Honorary Membership in the Association. The three men are Francis H. Kingsbury, George A. Sampson and Percy A. Shaw.

Another very great pleasure I have on behalf of the Association is to present an award of Honorary Membership to our guest from Birmingham, England—Mr. Charles A. Risbridger. [*Applause.*]

This afternoon Mr. Risbridger presented a very excellent paper, telling us about the organization of the water works in England. I am sure it will be very profitable to us in this country to know how other people work, and I hope that he in turn will take home to his country some information from his visit here that may be profitable to him and to them.

Mr. Risbridger was invited by the New England Water Works Association in furtherance of a plan of reciprocal relations which has existed between this Association and the Institution of Water Engineers of Great Britain. This, from their own *Journal,* I learn is the first invitation from America for a president of that association, and we certainly hope that it will not be the last, and that more will be accepted.

Mr. Risbridger served as subaltern in the Royal Field Artillery. He graduated in civil engineering from King's College, London University, and worked for contractors in England and Africa. From 1927 to date he has been on the staff of the Birmingham Water Department, rising to Chief Engineer in 1945. He was awarded a diploma by this Association for a paper presented in the summer of 1947 in England. He holds or has held several offices in the British Waterworks Association and in the Institution of Civil Engineers.

We are honored to have him as a guest. We have profited by the paper he presented this morning, and we hope that he will, by his visit here, cement the relationship that exists between this country and England.

When we look at the headlines today, we sometimes wonder whether we have any friends abroad, but I am sure that Mr. Risbridger, by his visit here and the high esteem we show for him, will help cement that bond, and I hope it will be the beginning of a long and profitable relationship to us both.

Mr. Risbridger, will you please say something to us?

I almost forgot to give him his honorary certificate. [*Handing certificate.*] [*Applause.*]

CHARLES A. RISBRIDGER. Mr. President, ladies and gentle-

men: But for one, for you, very fortunate circumstance, you would now be facing a very grave danger, in that when I am allowed to say a few words after such a delightful meal as I have enjoyed with you, when I warm up to my subject, I sometimes cannot be stopped by any means short of physical violence, and I know of nothing which would more properly, and which indeed it does, touch my heart than the wonderful hospitality and friendliness which I have received from the very moment I stepped foot on your soil.

That danger would have been greater, except for the particular circumstance that before this banquet began I partook, I think not unwisely, of the liquid manifestation of your hospitality. [*Applause.*]

Although I have been engaged most of my working life in collecting, transporting and distributing the damn stuff, I long ago realized that even a genius can stop on water, but if he were a genius he would not try. [*Laughter.*] Therefore, why lay claim to being a genius?

The particular circumstance which has saved you from the horrible fate is the intervention of Mr. Knox, who has told me—and I have it in writing—that I am to be very brief. [*Laughter.*]

Nevertheless, Mr. President, I am going to take time to do three very pleasant things. The first is to express to you the most cordial greetings of all my colleagues in the Institution of Water Engineers. I did express those greetings to your technical meeting this morning, but I told you I was going to risk repetition tonight. I now perceive that the risk of my not repeating it would have been greater than the risk of my repeating it. I am quite certain that had any of my colleagues at home had the exciting privilege that I have had of standing with you in the company of so many charming and beautiful ladies, they would fire me on the spot were I not to accept this opportunity of expressing our greetings and those of our wives and sweethearts to your wives and sweethearts, as well as to the equally charming but, in the interest of truth, not so beautiful men folks. [*Laughter.*]

Without any diffidence, therefore, I express the hope that the collaboration and the friendship between your Association, Mr. President, and my Institution will be one of many ties which,

when woven together, will form such a bond of friendship between your nation and my nation that no one will ever be able to break it. [*Applause.*]

My next great pleasure, sir, is to express my gratitude for the honor you have done me in conferring Honorary Membership in your Association upon me. I do not think I am a conceited man, and therefore I realize that what you have done, sir, is in honor of my Institution and not on account of any special merit or achievement of mine. I do not think this is a time for conceit. I am very, very proud indeed to be the recipient of that honor, and I assure you gentlemen that I will do my best to uphold the principles and the practice upon which your Association is founded.

My third great pleasure is to express my gratitude for the overwhelming hospitality which everybody has shown me here. I had heard from my friends back home something of the generosity of American hospitality, but it has to be experienced to be understood. In my turn, sir, I shall go back home and shall tell all my friends what a wonderful set of people I have had the privilege of meeting on their home grounds. I shall tell them of you, Mr. President, Mr. Knox, and your members and the ladies. I don't think any words of mine can really express what this hospitality has meant to me.

If I may, sir, I would like to refer to the extreme generosity of my host and hostess before the Convention started—Mr. and Mrs. Sherman Chase. They have been like a father and a mother to me. They have shown me how to eat some of your more intricate dishes. [*Laughter.*] They have been over to our country to conventions on several occasions, and I can assure you that you could send us no more welcome and no more successful ambassadors of good will. Mr. Chase of course is one of us; he is an Honorary Member of our Association. But I think I might tell you that he very nearly fell from grace on the last occasion he was with us when his first question was where he could pick up a minx. [*Laughter.*] He later explained that what he meant was a Hillman-Minx motorcar. [*Laughter.*] That shows you how careful we have to be in using words.

It reminds me of the editor of one of our city newspapers, who was a little discontented with something that the city coun-

cil had done or had not done, and in the next day's paper he wrote an editorial, headed "Half the City Council rose." The Council did not like that very much and instructed the clerk to ask the editor to retract. So that the next day he wrote another editorial, and he headed it "Half the City Council did not rise." [*Laughter.*]

Mr. President, for the opportunity to meet old friends, for the opportunity to make new ones, I am very, very grateful, and on behalf of the members of my Institution I wish you all good working, good playing, good friends and good health. [*Applause.*]

PRESIDENT BOGREN. I wish, sir, that I were half as smooth as you, so that I could express to you as accurately as you have expressed to us how great our pleasure is in having you here, but unfortunately I am not as gifted in that respect.

Another announcement I have to make is that Mr. and Mrs. Naylor are attending their 53rd Convention of the New England Water Works Association. I think that is quite a record.

[*Mr. and Mrs. Naylor stand; applause.*]

I have one more very pleasant duty to perform, and I wonder if Mrs. Alice Melrose would step to the rostrum for a moment. [*Applause.*] Mrs. Melrose, as you know, is our very, very efficient secretary in the Boston office, and she is going to be married. On behalf of the Association it is my great pleasure, Mrs. Melrose, to present to you a token of the esteem in which you are held by the members of this Association. [*Presenting chest of silver.*] [*Applause.*] This comes to you with the very good wishes of the members of the Association. [*Applause.*]

MRS. MELROSE. I am almost speechless, but thank you all so much for such a wonderful gift. I shall very much treasure it and enjoy using it, and I know my future husband will enjoy it as much. Thank you all again. [*Applause.*]

PRESIDENT BOGREN. This is the point in the program, ladies and gentlemen, that calls for the Presidential Address. I assure you that it will be brief. Before doing so I want to express my own personal thanks, and also the thanks of the Association, to those who make these meetings, both the annual convention and our monthly meetings, so profitable and so pleas-

ant. Each year it seems trite and commonplace to do this because there is no new way of expressing those thanks, but it still should be said, and I want you to know that I am sincere in saying it.

Gatherings such as this do not just happen; they result from the working of the committees on arrangements. Our technical programs just do not happen; they result from planning and the excellent work of your Technical Committees, the so-called Program Committees. The Technical Committees work in the background unobtrusively, but little by little they formulate the various reports, standards, studies and so forth, which are this Association's contributions to the water-works field. We are indebted to all of them.

We are also, of course, indebted to the Water and Sewage Works Manufacturers Association for their loyal support, not only in this meeting but for all our activities.

We have already expressed our thanks to Mrs. Melrose, a part of our secretarial staff, and it goes without saying that our thanks are also due to Mr. Knox, our Secretary, because, in spite of the fact that you enjoy booing him at every meeting, he is the one who greases the wheels and keeps things moving and has always done so. We are deeply indebted to Mr. Knox for it. [*Applause.*]

We also owe a debt to the people who repeatedly spend a great deal of time and effort in preparing papers. They should not be overlooked. They sometimes feel, and I believe rightly, that they are being honored in being asked, but at the same time so is the Association and so is the profession by their loyalty in presenting papers.

Lastly, of course, I am deeply honored to have served you for a year, although, as I say, things move so smoothly, due to the beautiful work of the committees, that the work of your president is usually easy. There are very, very few situations that require him to lose much sleep, and that is due to the very efficient working of all the committees.

PRESIDENTIAL ADDRESS

By George G. Bogren

By way of a brief address I should like to discuss a subject which is bound to face us more and more in the future—the competition for available water sources by public water-supply authorities, recreation groups, and industry; or, to put it another way, the allocation of priorities in the use of our prime natural resource, water.

During the business session of this convention on Monday, the reports of three committees touched upon this subject. The Committee on Conservation, Development and Utilization of Water Resources reported that unusual interest is being shown in Congress on this subject. The Committee on Legislation, reporting on legislative action affecting public water supplies, reported that, in Massachusetts, control over a body of water used as a municipal water supply was taken from the water department and placed in the hands of the Water Resources Board.

The report presented to this convention by your Committee on the Recreational Use of Water Supplies reiterated the long-held opinion that the present controls for the protection of public water supplies should not be relaxed. We cannot do otherwise; like President Coolidge, we must be against sin.

But certain trends in recent years make me wonder if our defense can be maintained indefinitely, and whether we should not be formulating long-range plans for eventualities that we do not now like to contemplate.

This sounds like a defeatist attitude, but it is not. I believe as strongly as anyone in the maintenance of the highest possible standards of raw-water purity, but I also believe that an inevitable force should be reckoned with, and early.

Studies and reports are continually being made by governmental groups on the conservation of water, and dire predictions are often made for the future because of the booming rate of population increase, shorter work week with greater leisure avail-

able, and a greater per-capita income. First priority is still given to public water supply, however.

One recent event that has aroused me is the condition of the railroads in this area. In an expanding economy, it would seem that mass transportation must prosper. But the popularity of the automobile has resulted in municipal, state and federal subsidies for highways, super-highways, parking garages and airports, a form of competition the railroads could not meet. The fate of the railroads should have been obvious to anyone for many years, but only when a major branch like the Old Colony Division of the New Haven actually set a legal date for the abandonment of passenger service did the Massachusetts legislators get aroused, and then only to apply emergency remedies, to postpone the date a year. In spite of the continued warnings of the railroads, legislators hoped that some miracle would occur to avoid the inevitable. I believe that the railroads will be given a form of relief, as mass transportation is indispensable, but the present dilemma should have been avoided by proper planning. The same concern for the railroads that was shown the auto and the plane could have evolved a balanced transportation scheme, but the popularity of the auto and the plane gave them the ear of our legislators.

I am fearful that the popularity of fishing, boating and bathing, and the economic necessity for fostering industry will likewise close the ears of our legislators to warnings of public-health experts, who wish to stand pat and refuse to adapt their protection of public water supplies to a changing world.

As another example of how our legislators listen to popular clamor rather than to expert advice, consider the matter of automobile traffic fatalities. Everyone bemoans them, and on holiday week ends the gruesome predictions are broadcast like odds on the Kentucky Derby favorite. State police and motor-vehicle registry heads state that the majority of fatal accidents are due to two chief causes—speed and drunken driving. What is being done, on a broad scale, to curb these causes? Are governors placed on cars? Are speed limits reduced? No. Horsepower of cars multiplies, super-highways are built at enormous cost, and speed limits are increased. (Did you notice that on Route 26, leading here from the Maine Turnpike, the speed limit is

posted at 60 miles per hour on a two-lane country road?) Speed is popular—people want action when they step on the gas—and what is popular prevails. And the very states whose police heads point to alcohol as a major cause of auto traffic fatalities run State liquor stores. Alcohol, too, is popular.

The popular attitude cited in these illustrations—and they could be amplified without end—will be for relaxation of present strict controls of public water supplies, and concurrent with the efforts of organizations which seek to maintain priority for public water supplies in conservation, development and utilization of water resources, there should be planning for the day when sources are too few to continue the present standards and controls.

President Eisenhower, in recently discussing means of alleviating tension in the Middle and Near East, said that economical de-salting of sea water is "just around the corner" and would be introduced in the desert areas as a means of raising the standard of living. I believe that it will be a long time before the Portland Water District pumps de-salted Casco Bay water up into Sebago Lake, or the Metropolitan District Commission pumps de-salted Boston Harbor water up its aqueducts to Wachusett and Quabbin Reservoirs for the use of growing inland cities and towns.

Water departments of medium-sized and small communities take comfort in the assumption that before their water sources become inadequate in capacity or quality for all competing uses, some sort of metropolitan system will be created to rescue them. This is in the American tradition, the so-called "thinking big." But in the case of conservation of water sources it is possible that the answer in many cases may consist of "thinking small" and conserving the medium and small sources. The Corps of Engineers has done this in flood control by constructing small flood-control works on tributary streams, rather than huge control works on main rivers. On the other hand, in the future for which we are planning, the large cities and water districts will also find their sources of supply the target of competing uses in a fast-increasing population.

It is pointless to complain without suggesting a possible remedy. I would not for a moment propose that planning for the

future sharing of water resources should consist merely of a calendar of concessions by water-supply authorities, or compromises with present vigilance. It should include a counter-attack for every significant retreat from present standards, and it should be done at the municipal and district level. Higher echelons are too susceptible to the popular clamor.

As an example of what can be done, let me cite what my home town of Wayland has done in its school-planning program. The school-planning committee had acquired sites for all the schools the town will ever need under presently foreseeable growth. For this they were acclaimed in the Boston press, and deservedly. In addition, the town adopted, after planning-board study, a new zoning district called the flood-plain, defined by a line following the Sudbury River valley, below which elevation no structure may be built without special permit from the Zoning Board. Wayland gets its water supply from wells in the river valley, and since all well sites are in the flood-plain district, potential future well-water supplies are, by proper planning, protected against encroachment by building developments. But why not have the town now acquire the sites for wells to supply the ultimate water needs of the town, as was done in the case of the schools?

The Federal Reserve System has a policy consisting of antidotes for any ailment of our monetary system. The Defense Department surely has in its pigeonholes strategic and tactical plans that can be put into motion instantly for any military reversal that this country may suffer in war, in spite of the recent silly talk in Washington to the effect that it is shameful even to consider surrender. Any military leader, whether corporal or general, and any business head, who does not have up his sleeve a plan for retreat when things go wrong, is not a leader but an unwarranted optimist. Even a gambler likes the comforting feeling of a fifth ace up his sleeve.

It may be argued that planning for future inadequacies of water, both in capacity and quality, even with compensating features, is an admission of the inevitable and will hence hasten the demands of these groups who would encroach on the public water-supply preserves. I believe the reverse to be true. Public utilities have always made it a practice to be prepared for emergencies.

We who work in the field of public water supply represent but one of the hands that are reaching for the available water sources. So far the other hands have been legally restrained in our favor, but, as the population increases, the hands of the farmer, sportsman, bather, boater and industrialist will compete with ours in reaching for a share of this precious resource, and their cry will be a popular one. The scientific merits of the case may be obscured. This and other similar organizations, and the water utilities they represent, should plan now not only to hold the line, but also properly to adapt present protective measures of all types to inevitably changing conditions.

I thank you. [*Applause.*]

* * *

PRESIDENT BOGREN. I should now like to call upon Mr. Willard Pratt, Chairman of the Tellers of Election, to report to this Association the result of their count of ballots.

WILLARD S. PRATT. Mr. President, ladies and gentlemen, I wish to report for the Tellers of Election as follows:

REPORT OF THE TELLERS OF ELECTION

Number of votes cast	390
FOR PRESIDENT: Clarence L. Ahlgren	388
FOR VICE-PRESIDENT: Kenneth W. Robie	387
FOR DIRECTOR: Kenneth F. Knowlton	386
FOR TREASURER: William P. Melley	386

Respectfully submitted,

EMERY S. LITTLEFIELD
CLARENCE H. REED
(*Signed*) WILLARD S. PRATT, *Chairman*

PRESIDENT BOGREN. Thank you. I hereby declare the slate just read to you to be the duly elected officers of this Association.

I wonder if the new Director, Mr. Kenneth F. Knowlton, will stand and be recognized.

[*Mr. Knowlton stands; applause.*]

It is now my great pleasure to turn over to my successor, your President-elect, Mr. Clarence L. Ahlgren, Assistant Super-

intendent of the Manchester, New Hampshire, Water Department, the meeting. [*Applause.*]

President Clarence L. Ahlgren in the Chair.

PRESIDENT AHLGREN. Mr. ex-President, our distinguished guest from across the water, and the entire family of the New England Water Works Association:

I want to submit to you, Mr. Risbridger, that the success of this convention is not entirely due to the male members of this Association, because it includes the very lovely ladies to whom you referred so kindly.

It is with a deep sense of appreciation and duty that I accept this high honor which you have conferred on me tonight, and also with a very humble sense of appreciation, because I look back at the very illustrious array of men—outstanding men of this Association—who have preceded me, and also at the very outstanding men who are presently members of this Association. I also look forward to this coming year as a great one because of the wonderful organization that has developed down through the years under our very able Executive Secretary, Joe Knox. [*Applause.*]

My first official act, and a very pleasant duty, is to present to George Bogren the certificate as Past-President of this Association. George, it is a great pleasure for me to present this to you on behalf of the Association for the wonderful leadership that you have presented to us this year. [*Handing certificate to Mr. Bogren; applause.*]

MR. BOGREN. Thank you very much.

PRESIDENT AHLGREN. The second official act of the President is to announce that now dancing will begin in the ballroom, and officially to declare the 76th Annual Convention of this Association officially closed.

I thank you. [*Applause.*]

ANNUAL REPORT OF THE SECRETARY

August 31, 1958

Mr. President, and Members of the New England Water Works Association:

The Secretary herewith submits the following report of the changes in the membership during the past fiscal year, and the general condition of the Association.

The present membership is 1,124, constituted as follows: 14 Honorary Members, 918 Members, 155 Associates and 37 Corporates.

MEMBERSHIP

				Total
September 1, 1957—Honorary Members		11		
Withdrawals:				
Died	2	2	9	
Elected	5		5	14
September 1, 1957—Members, total		912		
Withdrawals:				
Died	18			
Dropped	18			
Resigned	27			
Transferred to Honorary Member	3	66	846	
Elections:				
September 15, 1957	16			
October 17, 1957	6			
November 21, 1957	6			
December 19, 1957	4			
January 16, 1958	4			
February 20, 1958	3			
March 20, 1958	6			
April 17, 1958	7			
May 15, 1958	7			
June 18, 1958	6			
August 14, 1958	7		72	918

September 1, 1957—Associates, total		144		
Withdrawals:				
Resigned	1	1	143	
Elections:				
November 21, 1957	1			
December 19, 1957	1			
February 20, 1958	1			
April 17, 1958	3			
May 15, 1958	2			
June 18, 1958	2			
August 14, 1958	2		12	155
September 1, 1957—Corporates, total		36		
Elections:				
March 20, 1958	1	1		37
September 1, 1958—Total membership				1,124
September 1, 1957—Total membership				1,103
Gain of				21

ELECTIONS

Members

September 15, 1957—Howard B. Allen, Edward J. Bayon, Jack C. Brinton, Robert H. Culver, Thomas J. Fleming, Emery W. Goodwin, Richard E. Gorman, Joseph B. Hanlon, Harold E. Langley, Jr., Maurice V. Murphy, Jr., James T. O'Neil, Philip K. Reddy, Frank L. Rice, Hamilton Rumrill, James M. Symons, C. R. Winchester. (16). Prof. W. F. J. M. Krul, Honorary Member.

October 17, 1957—Joseph M. Creamer, Lawrence P. Johnson, Jr., Murray H. Mellish, Theodore E. Miller, Edwin M. Montstream, Donald M. Weinle. (6)

November 21, 1957—Russell J. Babcock, Fozy M. Cahaly, Howard C. Morse, Sanford J. Russell, Bradford S. Thomas, Lee Marc G. Wolman. (6)

December 19, 1957—Francis P. Allen, Jr., Ramchandra S. Ambekar, Gordon N. Ells, Lyman R. Howard. (4)

January 16, 1958—Charles H. Connors, Douglas H. Perkins, Alphonse L. Savignac, Werner Stumm. (4)

February 20, 1958—Richard E. Johnson, Joseph C. Karnella, Donato Richardi. (3)

March 20, 1958—Albert I. Bennett, Joseph E. Heney, Arthur A. Lamelin, Edward P. Looney, Sherwood Lovejoy, Frank T. Smith, Jr. (6)

April 17, 1958—Donald C. Bassett, Arnold C. Blake, John P. Gratiot, Walter E. Jacques, Charles T. Main, II, Leonard H. McKane, Earl A. Umlah. (7)

May 15, 1958—John Bower, George B. Fischer, J. William Houle, Stephen W. Leavenworth, Thomas H. Matthews, Norman J. St. Sauveur, Carmelo D. Tempesta. (7)

June 18, 1958—Bruno Bisi, John A. Gregory, Jr., Joseph A. Kestner, Jr., Chester G. Pelkey, Rev. James W. Skehan, Leo V. Willett. (6)

August 14, 1958—Philip Coykendall, Leo J. Gagnon, George A. Goodridge, Martin W. Graham, Philip B. Hopkins, Henry N. Junior, Frederick W. Kent, Jr. (7)

Associate Members

November 21, 1957—Holyoke Machine Company, The. (1)

December 19, 1957—Scott Associates, Inc. (1)

February 20, 1958—The Preload Company, Inc. (1)

April 17, 1958—Fisher Tank Company, The Maxim Silencer Company, Natgun Corporation. (3)

May 15, 1958—Concrete Pipe Corporation, Everett J. Prescott, Inc. (2)

June 18, 1958—Eastern Gunite Company, Gar Wood-Boston Truck Equipment, Inc. (2)

August 14, 1958—Burgess-Manning Company, The E. H. Wachs Company. (2)

Corporate Member

March 20, 1958—Board of Water Commissioners, Watertown, Mass. (1)

WITHDRAWALS

Members

Died—James W. Blackmer, Lew Brigham, Charles C. DeFronzo, Linn H. Enslow, Frank L. Flood, Walter F. Garland, Richard K. Hale, Francis L. Hatch, Maurice F. Hennessey, Harry A. Nutting, LeRoy M. Peterson, Charles W. Sherman, Chester R. Spinney, Leander G. Smith, William F. Sullivan, Lewis L. Wadsworth, George N. Watson, George F. Wieghardt. (18)

Dropped—William H. Balke, Jr., Edward D. Barton, Herbert P. Barton, Nelson Boardman, Constantine J. D'Amato, Clarence J. Dougal, Charles A. Duffy, Charles A. Gibbons, Alfred E. Kaeppel, Matthew E. Kearns, Jr., Henry A. Kingsbury, Edward Martinsen, R. Nelson Molt, Louis Neleber, Julius A. Nido, Hugo Perez-LaSalvia, Peter Popielarczyk, George W. Wood. (18)

Resigned—John T. Barnhill, John B. Belknap, Mayo Carrington, Henry Cheetham, Jr., Charles H. Darling, Raymond F. Ford, George F. Gay, Karl Haartz, William Harford, John A. Hawthorne, Thomas E. Harding, James P. Kelley, William A. Lamont, Frederick F. Libby, Ira P.

MacNab, Rudolph E. Martin, Frederick W. Merrill, Joseph E. Moore, Harry P. Morrissey, Samuel F. Newkirk, Jr., Earl R. Perry, Oscar J. Scammon, Elwood E. Smith, Frank Soracco, Elmer P. Tribou, Henry Warner, William G. Wilkie. (27)

Associates

Resigned—National Gunite Corporation. (1)

RECEIPTS FOR THE FISCAL YEAR SEPT. 1, 1957, TO AUG. 31, 1958

Entrance fees	$ 319.00
Dues, members of all grades	11,208.50
Interest	455.79
Advertising	5,750.65
Subscriptions	791.52
Sale of JOURNALS	43.82
Membership certificates	66.75
Membership lists	2.50
Convention registration fees	3,032.00
	$21,670.53

There is due the Association:

Dues	$120.00
Advertising	146.25
	$266.25

Respectfully submitted,

JOSEPH C. KNOX, *Secretary*

ANNUAL REPORT OF THE TREASURER

Boston, September 4, 1958

To William P. Melley, Treasurer
New England Water Works Association
Boston, Massachusetts

We have examined the statement of assets and funds and the statement of cash receipts and disbursements of the general fund and the scholarship fund of the New England Water Works Association for the year ended August 31, 1958. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

We traced all recorded receipts into the depository banks, verified the general fund bank account and petty cash fund and the scholarship fund bank account as at August 31, 1958, and examined properly approved vouchers for all disbursements. On September 3, 1958, we examined the paid-up cooperative bank shares at the First National Bank of Boston, and we verified by direct communication the cash on deposit in savings banks.

In our opinion, the accompanying statement of assets and funds and the note thereon and the related statement of cash receipts and disbursements of the general fund and the scholarship fund present fairly the financial position of the New England Water Works Association at August 31, 1958, and the recorded cash receipts and disbursements for the year then ended, on a cash basis consistent with that of the preceding year.

(*Signed*) SCOVELL, WELLINGTON & COMPANY

STATEMENT OF ASSETS AND FUNDS (Exhibit A)

As at August 31, 1958

Assets

Invested funds assets			
Cash in savings banks			
Boston Five Cents Savings Bank	$ 5,535.45		
Provident Institution for Savings	5,579.05	$11,114.50	
Securities			
Braintree Co-operative Bank, 5 paid-up shares	$ 1,000.00		
Sandwich Co-operative Bank, 10 paid-up shares	2,000.00	3,000.00	$14,114.50
General fund assets			
Cash, First National Bank of Boston		$6,734.81	
In office		50.00	
		$6,784.81	
Furniture and fixtures		1,180.00	7,964.81
Scholarship fund asset			
Cash, Milton Co-operative Bank			10,550.72
			$32,630.03

Funds

Invested funds		$14,114.50
General fund	$6,686.18	
Balance, August 31, 1957		
Excess of receipts over disbursements, Exhibit B	1,778.63	
	$8,464.81	
Transfer to scholarship fund	500.00	
Balance, August 31, 1958		7,964.81
Scholarship fund, Exhibit B		10,550.72
		$32,630.03

Note: The statement above, prepared on a cash basis, includes dues received in advance, $7,335, and employees' withholding tax, $134.27. It does not reflect the following:

Accounts receivable, dues	$120.00
Due on account of advertising	146.25
	$266.25

No depreciation has been taken on furniture and fixtures.

STATEMENT OF CASH RECEIPTS AND DISBURSEMENTS (Exhibit B)

For the Year ended August 31, 1958

General Fund

Receipts (exclusive of dues received in advance and employees' withholding tax)			
Initiation fees		$ 319.00	
Dues, 1957-1958 and prior years		3,873.50	
Convention registration fees		3,032.00	
Interest		455.79	
From publication of JOURNAL			
Advertisements	$5,750.65		
Subscriptions	791.52		
Sale of JOURNAL	43.82	6,585.99	
Miscellaneous			
Membership certificates	$66.75		
Membership lists	2.50	69.25	
Total receipts			$14,335.53
Disbursements			
Publication of JOURNAL			
Printing	$5,787.74		
Reprints	183.27		
Reporting	302.50		
Stationery and postage	139.56		
Editor's salary	750.00		
Sundry	124.44	$7,287.51	
General and administrative			
Salaries	$5,204.00		
Certificates of membership	179.11		
Printing, postage and stationery	63.13		
Office supplies and expense	271.38		
Office rent	1,260.00		
Electricity	95.42		
Telephone and telegraph	229.08		
Auditing	125.00		
Social security taxes	173.29		
Sundry	215.51	7,815.92	
Forward		$15,103.43	$14,335.53

Brought forward		$15,103.43	$14,335.53
Disbursements (continued)			
Meetings and committees			
Water works school	$ 125.00		
Printing, postage and stationery	1,353.62		
Convention expense	1,342.49		
Dinners	931.86		
Contribution to June conference	200.00		
Scholarship fund expenses	150.68		
Sundry	342.76	4,446.41	
Interest added to savings bank deposits		353.27	
Total disbursements			19,903.11
Excess of disbursements over receipts (exclusive of dues received in advance and employees' withholding tax for current year)			($5,567.58)
Dues received in advance		$7,335.00	
Employees' withholding tax			
Receipts for current year	$134.27		
Less Payments for prior year	123.06	11.21	7,346.21
Excess of receipts over disbursements, Exhibit A			$1,778.63
Balance, general cash, August 31, 1957			5,506.18
			$7,284.81
Transfer to scholarship fund			500.00
Balance, general cash, August 31, 1958			
Represented by			
Cash in First National Bank of Boston		$6,734.81	
Cash in office		50.00	
			$ 6,784.81
Scholarship Fund			
Balance, scholarship cash, August 31, 1957			$ 7,361.98
Receipts			
Contributions		$2,426.46	
Interest		262.28	
Transfer from general fund		500.00	3,188.74
Balance, scholarship cash, August 31, 1958			
Represented by cash in Milton Co-operative Bank, Exhibit A			$10,550.72

ANNUAL REPORT OF THE EDITOR

To the New England Water Works Association:

The Editor submits herewith his report for the year ending August 31, 1958. The financial figures, tabulated in the report, are derived from the report of the Treasurer, which contains a detailed statement of the receipts and disbursements on account of the September and December, 1957, and March and June, 1958, issues of the JOURNAL.

In Table 1 is presented a statement of the material contained in the four issues of the JOURNAL for the past year, while in Table 2 is given a comparison of the JOURNAL for the past year with those for preceding years.

TABLE 1.—STATEMENT OF MATERIAL IN SEPTEMBER AND DECEMBER, 1957, AND MARCH AND JUNE, 1958, ISSUES OF THE JOURNAL OF THE NEW ENGLAND WATER WORKS ASSOCIATION

	Number of pages								
	Papers	Proceedings*	Total text	Index	Advertisements	Cover and contents	Insert plates	Total pages	Total cuts (number)
Sept., 1957	112	4	116	0	46	4	1	167	28
Dec., 1957	47	63	110	9	47	4	1	171	3
Mar., 1958	73	34	107	0	47	4	1	159	12
June, 1958	134	6	140	0	48	4	0	192	27
Total	366	107	473	9	188	16	3	689	70

* Including standard specifications

Size. The four issues contained 689 pages, of which 473 were text.

Cost. The gross cost of the JOURNAL was $7,287.51, equivalent to $6.53 per member; the net cost was $701.67, equivalent to $.63 per member.

Reprints. Reprints of papers have been furnished to authors at cost.

TABLE 2.—COMPARISON OF JOURNALS OF THE NEW ENGLAND WATER WORKS ASSOCIATION
Four Issues for Fiscal Year Ending August 31

	1949[1]	1950[2]	1951[3]	1952[4]	1953[5]	1954[6]	1955[7]	1956[8]	1957[9]	1958[10]
Average edition (copies printed)	1,325	1,250	1,300	1,390	1,420	1,442	1,476	1,495	1,498	1,578
Average membership	905	921	957	1,017	1,057	1,077	1,089	1,106	1,110	1,114
Circulation at end of year	1,164	1,172	1,240	1,283	1,331	1,334	1,357	1,387	1,427	1,421
Pages of text	452	440	423	463	421	436	442	457	418	473
Pages of text per 1,000 members	500	477	442	456	398	405	406	413	376	424
Total pages, all kinds	661	666	703	671	635	652	655	674	626	689
Total pages per 1,000 members	731	723	734	660	601	606	602	610	564	618
Gross Cost:										
Total	$5,016.44	$5,240.51	$6,069.62	$5,423.98	$5,865.67	$6,108.76	$5,898.97	$7,060.88	$6,842.20	$7,287.51
Per copy	0.95	1.05	1.17	0.98	1.03	1.06	1.00	1.18	1.14	1.15
Per page	7.60	7.86	8.64	8.08	9.23	9.37	9.02	10.48	10.91	10.57
Per member	5.55	5.69	6.34	5.34	5.55	5.68	5.42	6.38	6.16	6.53
Per member per 1,000 pages	8.40	8.55	9.02	7.96	8.75	8.71	8.28	9.46	9.85	9.48
Per member per 1,000 pages of text	12.28	12.92	14.99	11.52	13.19	13.03	12.25	13.92	14.72	13.80
Surplus:										
Total	$1,058.96	$1,294.73	$ 351.34	$1,040.76	$ 500.97	$ 513.89	$ 101.11	$ 588.09*	$ 224.26*	$ 701.67*
Per copy	0.20	0.26	0.07	0.19	0.09	0.09	0.02	0.10*	0.04*	0.11*
Per page	1.60	1.94	0.50	1.55	0.79	0.79	0.15	0.87*	0.36*	1.02*
Per member	1.17	1.41	0.37	1.02	0.47	0.48	0.09	0.53*	0.20*	0.63*
Per member per 1,000 pages	1.77	2.12	0.53	1.52	0.74	0.73	0.14	0.79*	0.32*	0.91*
Per member per 1,000 pages of text	2.59	3.20	0.88	2.20	1.12	1.10	0.20	1.16*	0.48*	1.33*

[1] Including 107 pages of standard specifications and recommended practice.
[2] Including 25 pages of standard specifications.
[3] Including comprehensive index, 1882 to 1950.
[4] Including 16 pages of standard specifications.
[5] Including 87 pages of standard specifications and recommended practice.
[6] Including 71 pages of standard specifications and recommended practice.
[7] Including 8 pages of standard specifications.
[8] Including 27 pages of standard specifications.
[9] Including 47 pages of standard specifications.
[10] Including 28 pages of standard specifications.

* Net cost.

Circulation. The present circulation of the JOURNAL is:

Members, all grades	1,124
Subscribers	204
Exchanges	24
Advertisers	69
Total	1,421

JOURNALS have been sent to all subscribers and to advertisers.

Respectfully submitted,

(*Signed*) GEORGE C. HOUSER, *Editor*

REPORT OF MEMBERSHIP COMMITTEE

September 11, 1958

To the New England Water Works Association:

We are pleased to report that the Association had a net gain of 21 members over last year. Invitations to join the Association were sent to over 200 superintendents and other water-works officials throughout New England, through the cooperation of the other members of the Committee.

The following figures give the membership of the past two years:

As of Sept. 1, 1957		*As of Sept. 1, 1958*	
Members	923	Members	932
Associates	144	Associates	155
Corporates	36	Corporates	37
	1,103		1,124

Gain of 21

1958

Losses:			*Elections:*	
Members:			Members	72
Resigned	27		Junior members	0
Died	20		Associates	12
Dropped	18	65	Corporates	1
				85
Associates:				
Resigned	1			
Dropped	0	1		
Corporates:				
Resigned	0	0		
		66		

Respectfully submitted,

JOHN J. BAFFA
DONALD C. CALDERWOOD
EDWIN T. MCDOWELL
FRANCIS J. O'BRIEN
EDGAR P. SNOW
RICHARD S. WOODHULL
(*Signed*) GEORGE W. COFFIN, *Chairman*

REPORT OF THE FINANCE COMMITTEE

August 31, 1958

To the Executive Committee of the
New England Water Works Association:

The Finance Committee herewith submits its report on the budget for the year 1957-58, and its recommended budget for the year 1958-59.

The Committee has examined the figures obtained from the records of the Association during the past year and has consulted with the Treasurer concerning revenue and disbursements for the coming year.

The following tabulation is the estimated and the actual budget for the past year.

REVENUE FOR 1957-58

	Budget	*Actual*
Entrance fees	$ 200.00	$ 319.00
Dues	10,500.00	11,208.50
Interest	400.00	455.79
Advertising	5,600.00	5,750.65
Other Journal receipts	750.00	835.34
Registration fees	—	3,032.00
Miscellaneous	50.00	69.25
	$17,500.00	$21,670.53

DISBURSEMENTS FOR 1957-58

	Budget	*Actual*
General and Administrative	$ 7,900.00	$ 7,804.71
Journal	8,000.00	7,287.51
Meetings and Committees	3,100.00	3,606.66
Net expense of luncheons	1,000.00	839.75
Contingencies	500.00	500.00
	$20,500.00	$20,038.63

The deficit for the year was estimated at $3,000, but the year closed with a surplus of $1,631.90, due to the receipt of the registration fees collected at the convention, the prompt payment of dues and the fact that operating expenses were held to a minimum.

The invested funds of the Association are $14,114.50.

The following budget is recommended for the year 1958-59:

REVENUE

Entrance fees	$ 200.00
Dues	11,000.00
Interest	450.00
Advertising	5,600.00
Other Journal receipts	750.00
Registration fees	3,000.00
Miscellaneous	50.00
	$21,050.00

DISBURSEMENTS

General and Administrative	$ 8,850.00
Journal	7,700.00
Meetings and Committees	3,750.00
Net expense of luncheons	1,000.00
Contingencies	750.00
	$22,050.00

We refer you to the Treasurer's report, which includes the report of the auditors, Scovell, Wellington & Co., for further financial details and to the Secretary's report for changes in the membership.

Respectfully submitted,

(*Signed*) JAMES D. HALWARTZ, *Chairman*
EDWIN M. HOWARD
JAMES W. REILLY

ANNUAL REPORT OF THE SCHOLARSHIP COMMITTEE

To the New England Water Works Association:

The New England Water Works Association Program, proposed at the Annual Convention in September, 1954, and adopted by the membership by ballot in May, 1956, has now become a reality, with the fund amounting to $10,230.06 towards the goal of $25,000 and with accrued interest of $320.66 as of September 1. It is now possible to make a scholarship loan or grant from the income of the Scholarship Fund to Members and Junior Members in accordance with the Scholarship Program.

The Scholarship Committee thanks the following contributors for their support in attaining the initial Scholarship Fund goal of $10,000 and urges all members to continue their financial support of the program.

Respectfully submitted,

(*Signed*) WILLIAM B. DUFFY, *Chairman*
THOMAS R. CAMP, *Vice-Chairman*
RICHARD M. CLEVELAND, *Secretary*
WILLIAM P. MELLEY, *Treasurer*
RICHARD N. BERRY
ROGER W. ESTY
KENNETH F. KNOWLTON

Contributors to the New England Water Works Association Scholarship Fund

Aldrich, Ellwood H.
Ahlgren, Clarence L.
Almquist, Frederick O. A.
Arnold, Walter A.
Barnhill, Kenneth G.
Bengle, Victor N.
Blackmer, James W.
Bogren, George G.
Brown, Robert E.
Burke, Roland F.
Burlingame, Roland S.
Camp, Thomas R.
Capaldi, Edward F.
Carrington, Mayo
Chase, E. Sherman
Cianca, Oscar
Clark, Thomas W.
Classon, W. Guy
Cleveland, Richard M.
Clifford, John C.
Cobb, Edwin B.
Coffin, George W.
Cole, Daniel W.
Colton, William R.
Coughlin, Thomas F.
Crabtree, Henry G.
Craven, Thomas T.
Dresser, Herman G.
Duffy, John H.
Duffy, William B.
Eaton, Bruce P.
Emerson, Frank
Erickson, Ernest E.
Esty, Roger W.
Fair, Gordon M.
Fay, Spofford & Thorndike, Inc.
Ferry, Clarence E.
Flood, Frank L.
Fox, Benjamin E.
Frank, James A.
Fuller, Charles E.
Gage, Willard L.
Gavett, Weston
Gay, George F.
Gaynor, Lester
Gentleman, Lawrence M.
Gentner, Warren A.
Gifford, Allan T.
Glidden, A. Leland
Graf, August V.
Griswold, Harold W.
Grossman, Richard P.
Haley, F. W.
Hazeltine, Stephen
Hazen and Sawyer, Engineers
Hirsch, Philip
Hoad, William C.
Hodgdon, Clifton C.
Houser, George C.
Howard, Edwin M.
Howard, Paul F.
Hughes, Henry F.
Hunt, Henry J.
Jackson, Norman E.
Jacobson, Samuel
Jordan, Harry E.
Kennison, Karl R.
Killam, Elson T.
Knowlton, Kenneth F.
Knox, Joseph C.
Lamprey, Gerald H.
Lawler, Joseph C., Jr.
Learned, A. P.
Libby, Arthur C.
Loftus, Harry P.
Manganaro, Charles A.
Mansfield, Myron G.
Marston, Frank A.
Matera, James J.
McCarthy, Joseph A.
McDonald, A. H.
Mebus, George B.
Melley, William P.
Miller, David W.
Minkus, Alexander J.
Moore, Edward W.
Mountain, Albert E.
Naylor, William

CONTRIBUTORS TO SCHOLARSHIP FUND (*continued*)

Newell, I. Laird
Oakman, Roger G.
O'Hanlon, Joseph
O'Reilly, John S.
Pazziani, Paul
Reed, Clarence H.
Richards, John V.
Rockwell, Col. Willard F.
Root, Darrell A.
Russell, Vernon C.
Sampson, George A.
Scott, Walter M.
Shaw, Arthur L.
Shaw, Percy A.
Smith & Norrington, Engineers
Stearns, Whitney K.
Sullivan, William F.
Symonds, Allen M.
Symons, George E.
Thomas, Ariel A.
Tracy, Edward L.
Turnbull, Francis J.
Turner, Howard M.
VanGeenhoven, Harry
Veatch, N. T.
Walker, Kenneth H.
Wheeler, Robert C.
White, Ralph H.
Wolfe, Thomas F.

Bristol, Conn., City of
Biddeford & Saco Water Company
Bristol County Water Company
Connecticut Water Works Association, The
Consumers Water Company
Dedham Water Company
Greenwich Water Company
Grafton Water Company
Hampton Water Company
Hingham Water Company
Maine State Dept. of Health & Welfare, Div. of Sanitary Engineering
Maine Water Utilities Association
Massachusetts Waterworks Association
Massachusetts Water Works Company
Milford Water Company
Mystic Valley Water Company
New Canaan Water Company
New Hampshire Water Works Association
Noroton Water Company
Oxford Water Company
Salisbury Water Supply Company
Southbridge Water Supply Company
Torrington Water Company
Wannacomet Water Company

Aetna Engineering Company
American City Magazine
B-I-F Industries, Inc.
Britt Company, The M. C.
Byers Company, A. M.
Caldwell Company, George A.
Cement Lined Pipe Company
Centriline Corporation
Chapman Company, R. E.
Darling Valve & Manufacturing Company
Dresser Manufacturing Division
Eddy Valve Company
Ford Meter Box Company, The
Foxboro Company, The
Glenfield & Kennedy, Inc.
Hays Manufacturing Company
Hedge & Mattheis Company
Hersey Manufacturing Company
Hydraulic Development Corporation
Industrial Chemical Sales Division
Jenkins Brothers
Kennedy Valve Manufacturing Company
King & Company, Inc., E. & F.
Layne-New England Company
Lock Joint Pipe Company
Ludlow Valve Manufacturing Company

CONTRIBUTORS TO SCHOLARSHIP FUND (*continued*)

Moore & Company, Gil
Mueller Company
National Gunite Corporation
National Water Main Cleaning Company
Neptune Meter Company
Parsons Company, W. B.
Pitometer Associates, Inc., The
Pollard Company, Joseph G.
Prescott & Sons, H. R.
Red Hed Manufacturing Company
Roberts Filter Manufacturing Company
Shahmoon Industries, Inc.
Smith-Blair, Inc.
Smith Manufacturing Company, The A. P.
Torrington Supply Company
White Construction Company, R. H.
Wood Company, R. D.
Worthington Corporation — Gamon Meter Division

REPORT OF THE COMMITTEE ON COMMITTEES

1957-1958

To the New England Water Works Association:

The Committee on Committees, which is composed of the members of the Executive Committee, has reviewed the activity of the technical committees for the past year and recommends that all committees be continued as follows:

N.E.W.W.A.

8 Committee on Legislation
9 Committee on Reciprocal Relations with the Institution of Water Engineers (London)
11 Committee on Survey of Ground Water Supplies in New England
12 Committee on Rainfall and Yield of Drainage Areas
16 Committee on Coefficients for Friction in Pipe Lines
19 Committee on Water Quality and Treatment
21 Committee on Specifications for Cast-Iron Pipe and Fittings
22 Committee on Reinforced Concrete Pressure Pipe
23 Committee on Code for Pressure Piping
24 Committee on Laying Cast-Iron Pipe
25 Committee on Specifications for Steel Pipe
26 Committee on Standardization of Pipe Flanges and Fittings
28 Committee on Steel Standpipes and Elevated Tanks
30 Committee on Meter Specifications
37 Committee on Federal Activities
38 Committee on Fluid Permeability
39 Committee on Deep-Well Vertical Pumps
42 Committee on Conservation, Development and Utilization of Water Resources
44 Committee on Publicity
45 Committee on Recreational Uses of Public Water Supplies
46 Committee on Plastic Pipes and Plastic Linings for Water-Supply Uses
47 Committee on Methods of Financing Water-Main Extensions
49 Committee on Water-Works Safety Practice

The establishment of a committee, to be known as N.E. W.W.A. 50—Committee on Prestressed Concrete Water-Storage

Tanks, has been approved by the Executive Committee. This committee, whose personnel will be appointed by the Executive Committee in October, will study the feasibility of establishing standard specifications for prestressed concrete water-storage tanks.

One of the most important activities of the Association is the work of its technical committees in preparing specifications and following current trends in the water-works practice.

The Committee on Committees wish to express their appreciation for the time and effort spent by the various technical committees. Suggestions relative to the establishment of new committees or the work of the existing committees are solicited and should be sent to the Committee on Committees.

Respectfully submitted,

COMMITTEE ON COMMITTEES

ANNUAL REPORT OF THE COMMITTEE ON LEGISLATION

September 15, 1958

To the New England Water Works Association:

Your Legislative Committee submits herewith its report on activities in the legislatures of the New England States during the year 1958. Only two states—namely, Massachusetts and Rhode Island—held sessions, and your committee member from each has filed informative material, which has been incorporated into this report.

Massachusetts

In Massachusetts the General Court, which is still in session at this writing, enacted the following measures relating in greater or lesser degree to water-supply matters:

CHAPTER 254.—"An Act requiring that the will of the voters be ascertained before any public water supply system is fluoridated". This Amendment of Chapter 40 of the General Laws provides that a referendum be held subsequent to September 1st, 1958, in any city, town or district to determine whether the domestic water supply shall be fluoridated. A majority vote in either direction is the determining factor.

CHAPTER 353.—"An Act authorizing certain water companies or corporations to take by eminent domain certain property, rights and easements." This Amendment of Chapter 165 of the General Laws relates to private water companies or corporations having franchise rights encompassing an entire city, town or district and expands the coverage of Chapter 165 as to the rights of said private companies or corporations to take property by eminent domain for water-supply purposes.

CHAPTER 414.—"An Act further regulating the drawing of water from Muschopauge Pond by the towns of Rutland and Holden." While this measure, generally speaking, is of interest only to the two subject towns, it is included in your committee report because of the provision in the Act that the Water Resources Commission shall be the arbiter when duly petitioned by said towns as to quantities that may be withdrawn under certain water levels in Muschopauge Pond.

CHAPTER 415.—"An Act extending the date of expiration of funds for the investigation of the ground water resources in the counties of Plymouth and Bristol." Section 20, Chapter 314 of the Acts of 1957 is hereby extended one year to 1959.

CHAPTER 527.—"An Act further regulating the testing of water meters". Whereas this Amendment of Chapter 40 of the General Laws is rather

lengthy, we suggest that interested members of the Association refer to a copy of the Act.

The following resolves were approved during the current session:

CHAPTER 70.—"Resolve providing for an investigation and study by the Water Resources Commission relative to methods of providing an adequate water supply to the cities and towns of the Commonwealth during a period of drought or other emergency." The Commission is required to report to the General Court with recommendations, if any, and suggested or proposed legislation if necessary, by the last Tuesday of December in the current year.

CHAPTER 88.—"Resolve further reviving and continuing the Special Commission established to investigate and study the feasibilty of establishing a Southeastern Massachusetts Water District and other subject matters". The Special Commission under the provisions of the Resolve must report with plans and estimates to the General Court on or before May first, 1959.

CHAPTER 96.—"Resolve providing for a study by the Water Resources Commission of the waters of the Ware, Quaboag and Quinebaug River Valleys". The Water Resources Commission is requested to file its report, the results of its study and recommendations, etc., on this subject by the first Wednesday of March, 1959.

CHAPTER 105.—"Resolve providing for an investigation and study by the Department of Public Works and the Department of Public Health relative to the removal of substances polluting certain waterways and charging the cost thereof to the person responsible for such pollution". The Division of Waterways and the Department of Public Health, acting jointly, are directed to go into this matter thoroughly and report jointly to the General Court the results of their investigation and study, their recommendations and proposed legislation, if necessary, on or before the last Tuesday in December in the current year.

A measure which appears assured of passage is House Bill 3185, titled—"An Act Relative to Membership of the Board of Registration of Professional Engineers and of Land Surveyors and Regulating the Practice of Professional Engineering and of Land Surveying." This proposed legislation amends and clarifies Chapters 13 and 112 of the General Laws and is very lengthy. Accordingly, it is suggested that interested members obtain a copy.

Senate 781 proposes legislation as follows: "An Act increasing the amount of water which the town of Clinton may take for water supply purposes from the Wachusett Reservoir of the Metropolitan Water System."

The provisions of this bill are of interest to those cities and

towns in the Commonwealth taking their water supply from the Metropolitan District Commission. S-781 is an amendment of previous legislation and at the date of the writing of this report is in the Senate Ways and Means Committee for consideration. We have been advised from reliable sources that S-781 will receive approval and be enacted in an amended form.

An indication of the growing importance of water supply in the minds of members of the General Court was House Bill #2164, a petition for a resolve providing for an investigation and study by a special commission relative to the problems of converting sea water to fresh water. This proposed legislation was given "leave to withdraw" during the early part of the year.

Several measures of purely local interest were enacted during the session.

Rhode Island

Our committee member from Rhode Island reports the following enactments during the 1958 session of the Legislature in that state:

H-1091 is an amendment of and an addition to Chapter 46-15 of the General Laws, entitled "Water Resources Co-ordinating Board." Section 46-15-7 specifies the authority of the board in relation to employees and contracts necessary to carry out its duties. Section 46-15-8 authorizes members of the board and its employees to enter upon lands and waters for purposes of survey.

H-1493 is an amendment of Section 46-12-14 of the General Laws in Chapter 46-12 entitled "Water Pollution." The subject of this amendment is "Penalty for Violation of Orders," as issued by the Division of Sanitary Engineering of the Rhode Island Department of Health or its chief, who have authority to regulate matters bearing on water pollution.

Respectfully submitted,

(*Signed*) MARK F. CROKER, *Chairman*
JOHN W. COSTIGAN
WARREN A. GENTNER
WILLIAM A. HEALY
PHILIP J. HOLTON, JR.
EDWIN T. MCDOWELL
JOHN V. RICHARDS

REPORT OF COMMITTEE ON RECIPROCAL RELATIONS WITH INSTITUTION OF WATER ENGINEERS (LONDON)

September 15, 1958

To the New England Water Works Association:

Your committee on Reciprocal Relations with the Institution of Water Engineers presents herewith its annual report.

It was the unanimous opinion of the committee, confirmed by the Executive Committee, that the paper by Mr. F. H. Bullock, Past President of the Institution, and Engineer and Manager of the East Worcestershire Water Co., entitled "Management and the Water Industry," published in the August, 1953, Journal of the Institution, be awarded the Diploma of Merit in accordance with the reciprocal arrangement between our two Associations. The diploma was presented to Mr. Bullock in person by the chairman of your committee at the annual summer meeting of the Institution, held in Birmingham in May of the present year.

It is of interest to note that Mr. C. A. Risbridger, Water Engineer of Birmingham, who is our guest at this convention, was inducted into the office of President of the Institution at this meeting in Birmingham. It is also worthy of note that Mr. Risbridger received the Diploma of Merit in 1949.

With the award and presentation of our diploma this year it now becomes the duty of your committee to select outstanding papers, published in recent years in the New England Water Works Association's JOURNAL, for submission to the corresponding committee of the Institution of Water Engineers. This your committee will proceed to do.

Respectfully submitted,

DONALD C. CALDERWOOD
PERCY A. SHAW
(*Signed*) E. SHERMAN CHASE, *Chairman*

PROGRESS REPORT OF COMMITTEE ON COEFFICIENTS FOR FRICTION IN PIPE LINES

September 15, 1958

To the New England Water Works Association:

In compliance with the suggestion made in the September, 1954, report of this Committee, this report is largely confined to the progress of the work done by T. E. Larson, Head, Chemistry Section, Illinois State Water Survey, under Research Grant G-4007(R) from the National Institutes of Health, U. S. Public Health Service.

Since filing the 1956 Report of this Committee, work under this grant has consisted of several investigations to determine:

(1) the resistance of the unground interior surface of cast-iron pipe "as cast" to corrosion by water;
(2) the effect of pH on corrosion rates at specific rates of flow for waters of different characteristics;
(3) the relative influence of sulfate and chloride ions;
(4) the effect of Cl/alk ratio on machined cast-iron surfaces, and
(5) the development of a corrosion test chamber.

Samples of the hard "skin" scraped off the interior surface of cast-iron pipe, under polarized light, showed two or more components: long needle-like pyrozenes of monoclinic structure as $CaSiO_3$ or $FeSiO_3$ (Mg or Ma); and polyhedron garnets of cubic structure, such as $Ca_3Al_2(SiO_4)_2$ or $Fe_3Al_2(SiO_4)_2$.

This silicate "skin" is apparently responsible for the excellent resistance to corrosion by water. It is, however, quite brittle and, therefore, not a completely effective barrier.

Laboratory studies are being conducted to determine the effect of pH on the corrosion rates at 0.1 f.p.s. for zero-hardness waters having an alkalinity of 2.5 e.p.m. (equivalent parts per

million) and a Cl/alk ratio of 0.2. Results to date indicate the lowest corrosion rate to occur at pH 7.0. Tuberculation on machined cast-iron surfaces increased with the pH in this range from pH 6.0 to 9.0.

The relative influence of sulfate and chlorine ions showed no significant difference on the corrosion rate or tuberculation in concentrations of zero to 0.6 e.p.m. sulfate and 0.1 to 0.7 e.p.m chloride with water of 1.7 e.p.m. calcium hardness, 2.4 e.p.m. alkalinity, 0.29 $(Cl+SO_4)$/alk at a saturation index of —0.8, —0.3 and 0.

The effect of Cl/alk ratio on the corrosion of machined cast iron in waters having an alkalinity of 2.5 e.p.m. at calcium concentrations of 0.6 and 1.7 e.p.m. were studied. The pH was regulated to maintain a zero saturation index. The relationship of increased corrosion rate to increased Cl/alk ratio is minimized within 30 days with $CaCO_3$ stabilized water. The beneficial effect of higher calcium hardness is demonstrated even though the pH is less.

A corrosion test chamber of clear lucite has been developed, consisting of three sections, into each of which two cast-iron specimens are introduced. Calomel and platinum electrodes measure the relative corrosion rates. Three outlets are provided for testing the effects of water flow velocity. This type of corrosion test chamber may have applications, particularly at existing water plants, where a continuous test of the corrosive nature of the water is desirable.

A study is being conducted to determine the behavior of particular ions in water at the anode and cathode of a corrosion cell. A 9-compartment cell is being used, which has anode and cathode plates in the two end cells. Water flows continuously through the middle cell. Current is impressed between the two electrodes. Results of this study are promising, but additional work is required to permit a proper evaluation.

Other research work is being conducted by R. F. McCauley on the development of protective coatings for water mains and by G. E. Burnett for the Bureau of Reclamation on the value of plastic linings and coatings. These studies, as well as the

work being conducted under the Research Grant, will be followed by the Committee.

Respectfully submitted,

E. SHAW COLE
F. W. HALEY
J. C. ADAMS, JR.
W. D. MONIE
W. E. STANLEY
S. ROGERS
L. M. WOLMAN
(*Signed*) RICHARD H. ELLIS, *Chairman*

REPORT OF COMMITTEE ON SPECIFICATIONS FOR CAST-IRON PIPE AND FITTINGS

September 1, 1958

To the New England Water Works Association:

As your representative on ASA Committee A-21 on Specifications for Cast Iron Pipe, I wish to report that the past year has been occupied with the formalities of reorganization to suit the current "standby" status of this committee. Schedules of organization and procedure have now been adopted, and the newly constituted committee is ready for whatever problems arise relating to cast-iron pipe.

In a separate letter to the Executive Committee I have already requested that I be relieved of my assignment to ASA Committee A-21. In relinquishing this duty I am constrained to outline briefly the history of this committee for the benefit of any who may be unfamiliar with its purpose and scope.

Committee A-21 was organized on April 21, 1926, under the Procedure of the American Engineering Standards Committee. Its authorized scope is as follows:

> "Unification of specifications for cast iron pipe, including materials; dimensions; pressure ratings; methods of manufacture (including such new developments as centrifugal casting) insofar as they may be necessary to secure satisfactory specifications; elimination of unnecessary sizes and varieties; consideration of the possibility of developing a coordinated scheme of metallic pipe and fittings applicable to all common mediums; and methods of making up joints insofar as they are determining as to the dimensional design of cast iron pipe.
>
> "The types of cast iron pipe to include — bell and spigot pipe, flanged pipe, flanged and bell mouth fittings and wall castings, pipe elbows, tees, Y's, return bends and other fittings not now included in standard lists; cast iron pipe threaded for flanges or couplings. The standardization is not to include methods of installing pipe and similar matters, except as to the making up of joints in its relationship to the dimensional standardization of pipe and fittings, as noted above."

The "Sponsor" Societies are:

American Gas Association
American Society for Testing Materials
American Water Works Association
New England Water Works Association

At the outset NEWWA had two representatives on the large committee of delegates from consumer groups and producers. In the present committee NEWWA has one representative in a total of thirteen. The late Charles W. Sherman was the senior of your representatives from the inception of the committee until his retirement in 1941. The writer succeeded him and has had the satisfaction of contributing to the work of the committee for the last 17 years, during which have been produced numerous standard specifications and manuals. These documents have been noted in the annual reports of your representatives on this committee and have either been published in the JOURNAL or are on file for reference in the NEWWA Headquarters.

For the immediate future the work of ASA Committee A-21 will probably be mainly the occasional review and revision of existing standards to keep them up to date. Also it is not unlikely that from time to time entirely new problems will come before the committee, as changes in the state of the art and in details of design develop. This is still an important committee, and NEWWA should continue to participate actively in its work.

Yours respectfully,

(*Signed*) ARTHUR L. SHAW

REPORT OF COMMITTEE ON STANDARDIZATION OF PIPE FLANGES AND FITTINGS

September 1, 1958

To the New England Water Works Association:

Your representatives on ASA Committee B-16 on Standardization of Pipe Flanges and Fittings (which is NEWWA Committee 26) submit herein their report for the past year.

Specifications which have been issued in final form are as follows:

ASA B-16.5-1957, Steel Pipe Flanges and Flanged Fittings;
ASA B-16.10-1957, Face-to-Face and End-to-End Dimensions of Ferrous Valves;
ASA B-16.15-1958, Brass or Bronze Screwed Fittings;
ASA B-16.26-1958, Brass Fittings for Flared Copper Tubes.

Revisions of earlier drafts which are in the final stages of consideration include:

ASA B-16.1, Cast Iron Pipe Flanges and Flanged Fittings—Class 125;
ASA B-16.b, Cast Iron Pipe Flanges and Flanged Fittings—Class 250.

Numerous other specifications are in various stages of development. Many of these relate to products adapted to pressures and temperatures seldom of interest in the water-works field. Nevertheless, it will be expedient to continue NEWWA representation on this committee.

Yours respectfully,

(*Signed*) J. Porter Hennings
Arthur L. Shaw

PROGRESS REPORT OF COMMITTEE ON DEEP-WELL VERTICAL PUMPS

September, 1958

To the New England Water Works Association:

The Committee on Deep-Well Vertical Pumps (NEWWA 39) presents the following report:

Standard Specifications for Deep-Well Vertical Turbine Pumps (ASA 58.1-1955) were published in the July, 1955, issue of the Journal of the American Water Works Association. The Committee which prepared the specifications has been directed to prepare standards for submersible pumps. In addition, ASA has discontinued the B-17c Transmission Shafting Code, and it has become necessary for the Committee to prepare substitute standards for pump shafting in the above specifications.

In February, 1958, our committee received a tentative draft of "Submersible Pump Standards," for review and comment before March 5. We had photo-copies made of these standards, which were circulated to those members who, we felt, would be in a position to undertake such review. The following reviewed the standards and sent us their comments:

Dr. Carleton Moore	—	Chief Mechanical Engineer, Metcalf & Eddy
Mr. George S. George	—	Specifications Engineer, Metcalf & Eddy
Mr. K. W. Kimball	—	Kimball-Jones Co., Boston Representative Peerless Pumps
Mr. Baxter Robertson	—	Aetna Engineering Co., Boston, Mass.
Mr. Stewart S. Perry	—	Worthington Corp., Boston, Mass.
Mr. B. Keegan	—	Fairbanks-Morse Co., Boston, Mass.
Mr. G. C. DiSavino	—	Byron Jackson Pumps, Inc. Boston, Mass.

The comments of several of the above were received, photocopied, and forwarded by letter of March 3 to Mr. Mark H. Owen of Los Angeles, Cal., co-chairman of the ASA Committee B-58. The remainder were forwarded by letter of March 19.

By letter of April 11, Mr. Owen thanked our committee for the above comments and discussed the action taken by the task force of ASA Committee B-58. He also noted that the task force had received responses from 20 out of 24 committee members.

By letter of April 18, Mr. Owen sent our committee the final form of the Tentative Specifications for Submersible Pumps, as proposed for submission to the AWWA Convention in Dallas. Appended to the standards was a proposed substitution for the abandoned B-17c Specification on Transmission Shafting.

Your committee attended the meeting of the B-58 Committee at Dallas on April 21 and entered into the general discussion of the various features in the proposed standards and also in the proposed standards for pump shafting. The task force took the discussion and comments under advisement and planned to prepare final drafts of the material. To date, these final drafts have not been received by our committee.

The B-58 Committee is also charged with the preparation of procedures for field testing deep-well pumps. To our knowledge, this work is still in the preliminary stage.

We recommend that the NEWWA Committee 39 be continued until the above projects are completed.

Respectfully submitted,

(*Signed*) EDWIN B. COBB, *Chairman*

REPORT OF THE COMMITTEE ON CONSERVATION, DEVELOPMENT AND UTILIZATION OF WATER RESOURCES

September 15, 1958

To the New England Water Works Association:

The Committee on Conservation, Development and Utilization of Water Resources was established by the Executive Committee in 1951, in order that the Association might participate in developments then taking place toward the adoption of a national water policy. The primary function delegated to the Committee was to keep the Association informed of all activities in the water-resources field, so that appropriate action might be taken in the formulation of policies and proposed legislation.

Since 1951 the nation has become more and more conscious of our needs for water. Thus intelligent development and conservation becomes more vital if we are to meet the constantly increasing demands for this invaluable asset for municipal, industrial, agricultural and other uses.

Cognizant of the need for conserving and developing our water resources, President Eisenhower, in 1954, appointed a President's Advisory Committee on Water Resources Policy, to formulate the Administration's water-resources policy. The report of that committee, which was released in 1956, met with general approval, and it was anticipated that legislation embodying the recommendations in the report would be considered by the 85th Congress. However, such legislation has never been submitted for Congressional action. One outcome of the report was the formation of a President's Committee on Water Rights and Use, to study the relationship between the establishment of property rights to water and the economic and social development of the country. This committee is considering particularly the principles which should be incorporated into law relating to the right to appropriate and use water. The final report of the committee will be submitted to the President by October 31, 1958.

The Northeastern Resources Committee was formed in 1957, to follow through on the various proposals contained in the Report of the New England-New York Inter-Agency Committee. NRC is a State-Federal organization, composed of representatives of the seven Federal agencies concerned with natural resources and the six New England States. Its efforts are directed toward the coordination by State and Federal agencies of studies and projects involving the area's natural resources. During the past year NRC has held a public meeting in each of the six states, to receive suggestions and views which might aid in evolving and promoting a regional program for the progressive development and use of the natural resources of New England.

Pollution control is now being recognized as a most economic and practical method of conserving our water resources. Not only New England, but the entire nation is now engaged in an all-out campaign for clean waters. The construction of sewage treatment works to attain this objective has been stimulated to a great extent by Federal grants now available to municipalities under the Water Pollution Control Act (P.L. 660). As of June 30, 40 sewage treatment projects had been approved for Federal grants in New England; 4 had been completed, and 18 were under construction. In Maine and Vermont, State construction grants are now available to supplement the Federal grants and are accelerating the program in those States. It is anticipated that the 1959 New Hampshire Legislature will enact similar legislation. Under the program of the New England Interstate Water Pollution Control Commission and its member States, sewage works costing over $200 million have been completed or placed under construction in New England during the past ten years.

With more and more attention being focused on our water resources at every level of government and by numerous organizations, associations and groups, your Committee will keep the Executive Committee advised of all important activities relating to water resources, in order that the Association may take any action deemed appropriate.

Respectfully submitted,

(*Signed*) HARRY MANSON, *Chairman*
WALTER J. SHEA
JOSEPH C. KNOX

FINAL REPORT OF COMMITTEE ON RECREATIONAL USES OF PUBLIC WATER SUPPLIES

September, 1958

To the New England Water Works Association:

Your Committee to study the question of Recreational Uses of Public Water Supplies was appointed in 1953, when recreational interests were making serious pleas for the multiple use of water supplies. All over the country demands for more "play area" were following in the wake of the industrial and commercial boom.

The extremely small percentage of bodies of impounded water, both natural and artificial, which had long since been reserved for water supplies, were looked upon as one answer to this recreational space need.

Early in the picture some relaxation of the necessary tight controls on water supplies had been gained. However, nationwide interest focused attention on the problems of multiple use, which were debated in legislatures, courts, conventions, seminars, associations, town meetings, newspapers and on the radio and television.

The proponents of multiple use have forgotten that safe water has been achieved by continued labor on the part of groups of dedicated professional men and women. They are using as a prime argument the fact that our health record with respect to water-borne disease is so excellent that there is less need for the type of controls being exercised. They point out as an apparent incongruity in the current stand of water purveyors that water supplies being used by some consumers originate in polluted streams, as well as in upland lakes. They present as support for their proposals that some consumers are drinking water from lakes where recreation is allowed and only simple disinfection is practiced.

They argue that where multiple use is permitted, laboratory testing can provide data for determining the type of treatment

necessary, and that the U. S. Public Health Recommended Standards are reasonable limits. They overlook that these standards do not indicate limits that clean supplies may be polluted up to, but rather actually mean as clean water as possible with as little human activity as possible in and around it. They overlook the emphasis, in the Recommendations of the same body, on the importance of the sanitary field survey.

It has been interesting to note that on a nation-wide basis a few of the men and women, responsible morally and financially for the health, with respect to water supplies, of their communities, have favored and even practiced some relaxation of the strict control that we are familiar with here in New England.

However, the majority of these people, among them the more prominent professional men, recognize the extreme importance of maintaining all potable water in as safe a condition as is possible in all its stages. They recognize that theirs is a job of *prevention*, not one of cure, and that they are dealing with a potential medium of disease transmission, consumed by the entire population.

It is notable that two major metropolitan areas of the East, New York and Boston, have gone to more expensive, controlled upland sources for their water supply.

It should be emphasized that the water purveyor has the moral and financial responsibility of providing a safe and palatable water. In the discharge of this duty he must weigh a number of important considerations, as follows:

1. Water can transmit bacteria and viruses.
    a. Pollution can travel in pools and slugs.
    b. The quantities tested are minute compared to those consumed, and "slugs" of pollution can be missed in sampling.
    c. Bacteria can exist imbedded in algae or other foreign matter.
    d. Present testing procedure requires days for final results, during which time infection may be established.
    e. Negative tests are not conclusive evidence that a supply is safe.

f. There have been recent experiences with gross pollution from recreational use of supplies, both where simple chlorination was used and where complete treatment was practiced.

2. Man is a carrier of disease.
   a. There still remain reservoirs of infection with the organisms of water-borne diseases.
   b. Man's natural immunity has been lowered substantially by our sanitary excellence.
   c. Man travels extensively between states and internationally.
3. Drought conditions in recent years have emphasized that heavy draw-downs of supplies are necessary—a condition which is not compatible with recreational interests, and which concentrates the pollution where supplies are used for recreation.

Weighing the above considerations in the light of the need for *preventing* disease, rather than detecting it or curing it, establishes the need for a conservative policy on the use of a water supply. There is little to be said in favor of the suggestion that increased recreational use be permitted, and that the type of additional treatment required in any case be determined by a given sampling program.

Such a procedure comes under the heading of "trying to pollute up to a safe limit" and has no place in a safe sanitary consideration.

Your Committee is aware of the many factors involved in solving this problem. It is aware of the need to present a policy that will meet the needs of the smallest as well as the largest supply. It is aware of the lack of professional personnel in many of the smaller towns and cities. It is aware that in New England there are many such small areas.

The Committee realizes that in the great majority of instances the only administrative authorities that continually employ professional staff are the State Health Agencies and feels that, because of this, these bodies should have authoritative responsibility on proposals for multiple use of water supplies.

The Committee recognizes that Water Works managers have a moral and financial responsibility to provide a safe and palatable water supply and therefore must have the authority to establish such limitations on the use of the supplies under their control as are considered necessary by them in order to discharge such responsibility.

In addition, the Committee recognizes that the consumer uses and pays for the water supply and that his opinion should be recorded by hearing or referendum, whenever a proposed modification of the sanitary control of a water supply may result in degrading the raw water supply or in increased costs of treatment.

Finally, the Committee has reviewed with interest the outline of policy by the American Water Works Association Board of Directors on Recreational Use of Water-Supply Reservoirs. The Committee feels that the policy reflects much sound thinking. To coordinate the views of the Committee with the American Water Works Association policy, the same terminology will be used in this report.

The Committee respectfully presents to the Association recommendations and a resolution concerning the recreational use of water supplies.

Respectfully,

FREDERICK O. A. ALMQUIST
SIDNEY ANTHONY
EDWARD W. MOORE
WALTER J. SHEA
CLARENCE I. STERLING
EDWARD L. TRACY
(*Signed*) CLARENCE L. AHLGREN, *Chairman*

Recommendations of Committee on Recreational Uses of Public Water Supplies

State Laws and Regulations regarding the control of water supplies.

The Committee recommends that all laws and regulations regarding the control of public water supplies should be specific directives and should avoid discretionary clauses.

Proposals for Relaxation of Restrictions

Proposals for any relaxation of the sanitary controls of a water supply should be submitted:

First, to the State Health Agency for a review of the sanitary implications.

Secondly, only when the report of the State Health Agency is favorable, it should be reviewed by the water utility manager, who should have the authority to attach such limitations to the proposal as he considers necessary to prevent interference with his moral and financial obligation to produce a safe, palatable water supply.

Thirdly, it finally should be subject to review by the consumers at a public hearing or by referendum.

Policy on Recreational Use of Water Supplies

Reservoirs may be classified as follows:

Equalizing Reservoirs—Reservoirs, within the area served, delivering finished water (water ready for consumption) to the distribution system.

Policy—Recreational use of "equalizing reservoirs" and adjacent marginal land is inimical to the basic function of furnishing a safe and palatable water supply to the system's customers, and safe practice requires prohibition of all recreational activity in and about such storage reservoirs.

Terminal Reservoirs—Areas providing end storage of water prior to treatment and to delivery to the distribution system.

Policy—In general, recreational use of terminal reservoirs is inimical to the basic function of furnishing a safe and palatable water supply to the system's customers, and should be prohibited.

Upstream Reservoirs—Reservoirs providing storage of raw water at various points in the watershed, to provide or supplement the supply at the terminal.

Policy—Recreational use of *upstream reservoirs* should be subject to the control of the sanitary regulations of the State Health Agencies concerned and to such limitations as the water utility management considers necessary for preventing interference with its obligations to produce a safe, palatable, domestic water supply.

A Resolution Concerning Recreational Use of Public Water Supplies

Whereas:

Man is a carrier of disease, and

There are reservoirs of infection still prevalent, and

Interstate and international travel is heavy, and

Man's natural immunity is constantly lessened by his excellent sanitary environment, and

Whereas:

Water is still a potential disease-transmission medium, and

The results of laboratory testing are so delayed as to allow infection of a community not protected by proper sanitary controls of its water supply, and

Treatment facilities and processes are not completely infallible, and

There have been recent experiences of gross pollution of supplies where recreation was allowed.

Now, Therefore, Be It Resolved:

That the New England Water Works Association opposes legislation or administrative action that will permit or require the opening of domestic water-supply reservoirs and adjacent lands to recreational use.

And Be It Further Resolved:

That the New England Water Works Association registers its approval of the policy to maintain the control of domestic water-supply reservoirs in the hands of the State Health Agencies and of the Water Purveyors and of the Consumers.

References for Study Concerning the Recreational Use of Public Water Supplies

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REPORT OF COMMITTEE ON PLASTIC PIPES AND PLASTIC LININGS FOR WATER-SUPPLY USES

To the New England Water Works Association:

The Committee has received copies of the second report from the Testing Laboratory of the National Sanitation Foundation, Ann Arbor, Mich., dated April 15, 1958. Like the earlier report of May 1, 1956, this lists plastic pipe and fittings which have been tested and approved as satisfactory for potable water-supply use. There are over 100 variations of pipe in the last report. Your committee recommends that those interested obtain this information from the Foundation.

Testing in the Lawrence Experiment Station has shown that at least two types of soluble cements, furnished for making joints in polyvinylchloride and polyethylene pipe, have given undesirable tastes and odors which persisted for several months. The same types of pipe made up with threaded or compression joints did not impart the same odors and were practically tasteless. Fittings and short lengths of three types of plastic pipes, polyethylene, polyvinylchloride, and a third type rubber modified polystyrene, after being submerged continuously or intermittently in domestic sewage for over a full year show no signs of deterioration, except slight discoloration on a few pieces.

A gridiron of 12-ft. sections of polyvinylchloride pipe, ranging in size from 1-in. to 2-in., and connected by both metal and plastic fittings, and with both threaded and cemented joints, has withstood several hundred intermittent water-hammer strokes with an instantaneous pressure of 150 psi without any other damage than one very fine leak.

Respectfully submitted,

(*Signed*) JOSEPH A. MCCARTHY, *Chairman*
CHARLES B. HARDY
JOHN P. LYNCH
I. LAIRD NEWELL

REPORT OF COMMITTEE ON WATER-WORKS SAFETY PRACTICE

September 1, 1958.

To the New England Water Works Association:

The Committee on Water-Works Safety Practice was appointed by the Association in October, 1957, and is, in effect, a joint committee with the American Water Works Association. The A.W.W.A. instituted a Safety Award Program in 1957, requesting each section of the A.W.W.A. to take part in the program. The request was made, also, that in the initial phase of the program only those utilities which had membership in the A.W.W.A. be contacted. Accordingly, safety report forms were distributed by the Committee to all water utilities in New England having representation in the A.W.W.A.

Of the forms sent out to cover the year 1956, 26 were returned, and 15 of these submitted sufficient data so that consideration could be given to judging for safety awards. For the year 1957, 32 report forms were returned, 17 of which were completed sufficiently so that consideration could be given toward awards. As a result of these safety reports, awards were made on March 20, 1958. These are based on number of lost-time injuries, the man-hours worked, and the number of employees. A summary of the data leading to the awards follows this report.

Through the activities of this Committee at least one superintendents' round-table discussion during the past year was devoted to water-works safety practices. It is recommended that this practice be continued and the safety theme be made a part of the superintendents' round-table discussions whenever possible. It is hoped that during the coming year the Safety Award Program can be extended to include all water utilities in the New England area.

The Committee strongly urges that every water utility obtain a copy of the A.W.W.A. Manual, titled "Safety Practice

for Water Utilities," and that safety programs be instituted in each water utility as soon as possible.

Respectfully submitted,

HERMAN BURGI, JR.
MARK F. CROKER
LENDON F. DUTTON
PHILIP J. HOLTON, JR.
JAMES F. SWEENEY
(*Signed*) RALPH M. SOULE, *Chairman*

Agency	Year	No. of lost-time injuries	No. of days lost—injuries	Permanent disabilities	Fatal injuries	Average no. of employees	Man-hours worked	Injury-frequency rate	Remarks
Connecticut									
Bridgeport Hydraulic Co.	1956	21	289	0	0	296	592,000	35.5	Award of Honor presented 3/20/58
	1957	3	152	0	0	267	565,360	5.3	
Maine									
Woodland Water & Elec. Co. Winter Harbor Water Co.	1956	No organized safety program							
Richmond Water Works So. Berwick Water Co.	1957	0	0	0	0	8	15,000	0	Award of Merit presented 3/20/58
Massachusetts									
Ashburnham Water Dept.	1957	0	0	0	0	3	4,420	0	Award of Merit presented 3/20/58
Vermont									
Brattleboro Water Dept.	1957	0	0	0	0	10	26,500	0	Award of Merit presented 3/20/58

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1958-1959

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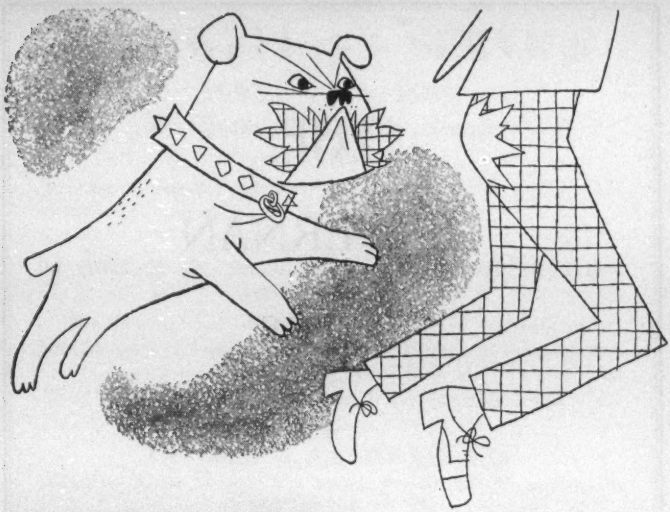

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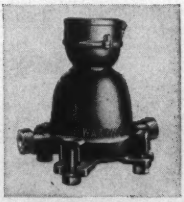

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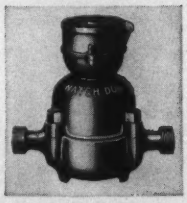

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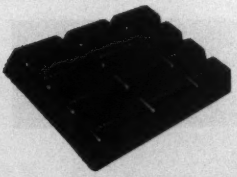

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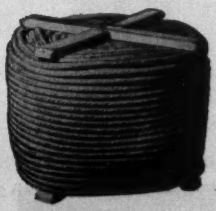

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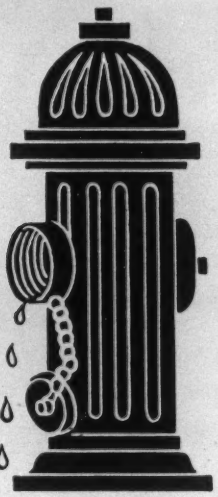

Dirty, clogged water mains are a serious—dangerous threat to any fire fighting organization. Low water pressure caused by incrusted pipes often makes the difference between minor damage and major conflagration. Yes, dirt can mean disaster. Your community deserves the extra-protection of clean water mains.

And, National with almost a half-century of cleaning experience can guarantee restoration of any water main to at least 95% of its original rated capacity!

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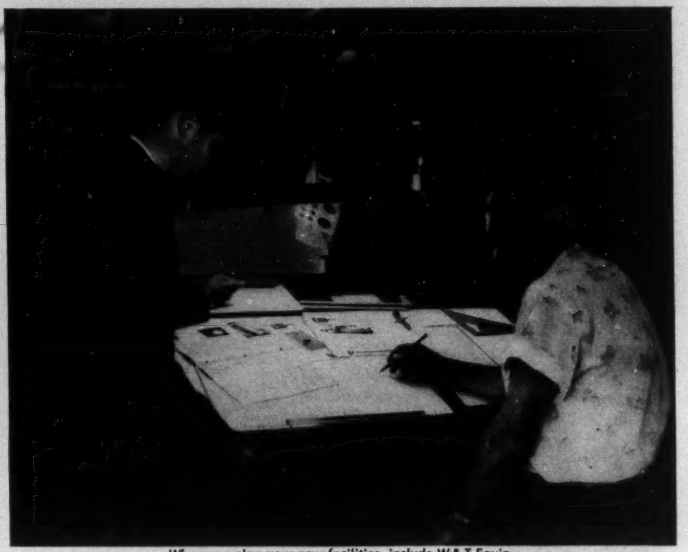

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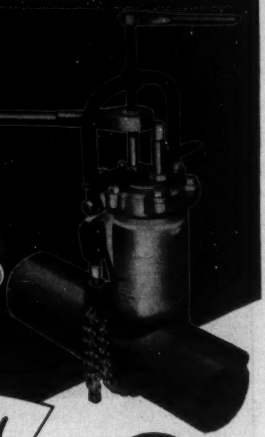

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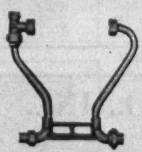

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. . . that conform to A.W.W.A. specifications in all respects

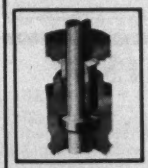
FIG. 56
- Inside Screw
- Non-Rising Stem
- Parallel Seats
- Bell Ends

FIG. 571X
- Inside Screw
- Non-Rising Stem
- Parallel Seats
- Mechanical Joint Ends

FIG. 561
- Inside Screw
- Non-Rising Stem
- Parallel Seats
- Flanged Ends

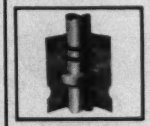
FIG. 566
- Outside-Screw-and-Yoke
- Rising Stem
- Parallel Seats
- Flanged Ends

Construction features . . .



Conventional stuffing box

with adjustable gland has ample space for packing that conforms to Federal specification HH-P-106c. The bottom face of the stuffing box flange is faced smooth to form bearing surface for stem thrust collar.



O-Ring seals

once installed no adjustment of any kind is required. The top O-Ring is the dirt seal and the bottom O-Ring is the pressure seal.

Operating nut

is Higher Strength Cast Iron. The base flange, with arrow indicating direction to open, is shaped to permit access from ground surface to adjust gland nuts with an extension socket wrench.

KENNEDY A.W.W.A. Standard gate valves are designed specifically for use in water works systems. Conforming to A.W.W.A. Specifications, in several particulars these valves exceed these standards of strength and refinements of design.

While A.W.W.A. Specifications cover only bell end and flanged end non-rising stem valves, the KENNEDY line also includes outside-screw-and-yoke valves and a wide variety of pipe connections including: Bell Ends, Flanged Ends, Mechanical Joint Ends, Universal Pipe Ends, Asbestos Cement Pipe Ends, Screwed Ends, Ring-Tite Pipe Ends and Spigot Ends.

In addition to standard features, KENNEDY A.W.W.A. Valves have reduction gearing, gear cases, by-passes; indicators and rollers, tracks and scrapers available on 16" and larger sizes. Gearing is always furnished on 30" and larger valves.

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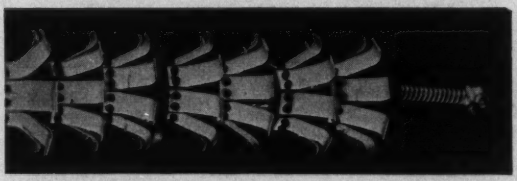

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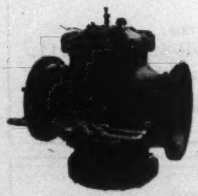


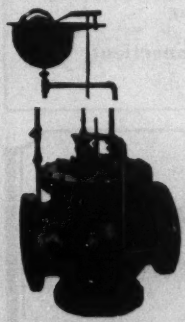
Controls elevation of water in tanks, basins and reservoirs

ALTITUDE VALVE
1. Single Acting
2. Double Acting

Maintains desired discharge regardless of change in rate of flow pressure

REDUCING VALVE

Regulates pressures in gravity and pump systems; between reservoirs and zones of different pressures, etc.



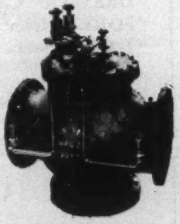
Maintains levels in tank, reservoir or basin

1. As direct acting.

2. Pilot operated and with float traveling between two stops, for upper and lower limit of water elevation.

FLOAT VALVE

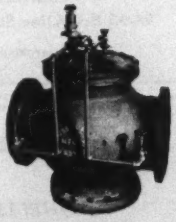
A self contained unit, with controls three or more automatic



COMBINATION VALVE

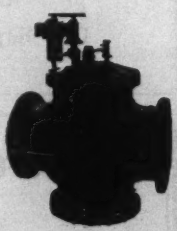
Combination automatic control both directions through the valve.

Maintains safe operating pressures for conduits, distribution and pump discharge



SURGE-RELIEF VALVE

Electric remote control—solenoid or motor can be furnished



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Adapted for use as primary or secondary control on any of the hydraulically controlled or operated valves.

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Cement Lined Service Pipe

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U.S. cast iron PIPE FOR WATER, SEWERAGE AND

bottle tight

tighten. What's more, you can lay Tyton Joint pipe in rain or wet trench if need be. Result? More working days... fewer delays... time and money saved in the trench.

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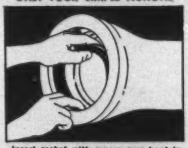
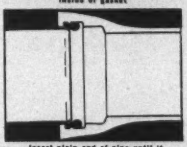
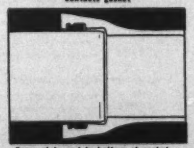


Insert gasket with groove over head in gasket seat

Wipe a film of special lubricant over inside of gasket

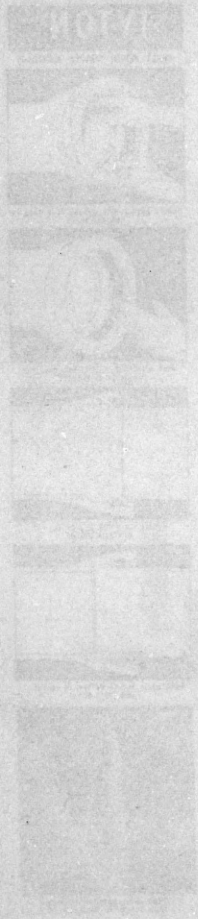


Insert plain end of pipe until it contacts gasket



Force plain end to bottom of socket... the job's done!

8" Tyton Joint water line for new high school in Alabama.



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